A STUDY OF STRATEGIC ALLIANCES BETWEEN INDIAN AND FOREIGN COMPANIES WITH REFERENCE TO THE INDIAN PHARMACEUTICAL INDUSTRY

ABSTRACT

OF THE

THESIS

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INTRODUCTION

Strategic Alliances

Sustained inflation; heavy costs of developing and commercializing new technologies, processes and products; increased complexity of regulatory compliance; the need to compete on a world-wide basis and the increased marketing costs associated with competing in a mature market have led to increase in business expenses *(Barrie, 1985).* Firms are looking at alliance strategies, which can offset, to some extent, some of the high cost/high risk syndrome.

An alliance is defined as any inter-firm co-operation that falls between extremes of discrete, short-term contracts and the complete merger of two or more organizations, (*Contractor & Lorange, 2002).*

Growing regulatory pressures and introduction of risk evaluation and mitigations strategies, makes it increasingly difficult for the approval of new drugs, which would eventually lead to greater cooperation between pharmaceutical companies. An understanding of the pharmaceutical environment in India and the alliances that have happened between Indian and foreign pharmaceutical companies over the last four decades can help companies in the future to realize their business objectives effectively through alliances and collaborations. Some of the reasons that substantiate the necessity of a research on this subject are enumerated below:

- The alliances between Indian and foreign pharmaceutical companies have increased over the years.
- Alliances today involves multimillion dollars, with clear business objectives, hence understanding them can mitigate failures.
- Alliances have an impact on many aspects of the business including people, studying the factors that have influenced the alliances between Indian and foreign pharmaceutical firms can help develop a clear picture of alliance success factors.
- An in depth research highlighting the areas of improvement may prompt increased regulations, which will enhance the scope for investments.

LITERATURE REVIEW

Porter (1980), indicated that a firm's membership in an industry governs its strategic orientation. Porter develops three potentially successful generic strategies for creating defensible position and outperforming competitors in a given industry.

- Overall cost leadership in consideration with quality and service.
- Differentiation either in product or service that is recognized industry wide as being unique.
- Focus strategy, in which the firm concentrates on a particular group of customers, geographic markets or product line segments.

Global Trends in Strategic Alliances in the Pharmaceutical Industry

The pharmaceutical industry is a knowledge driven industry and is heavily dependent on Research and Development for new products and growth. Since 1930 many large firms have specialized in chemical modifications of basic compounds in the quest to produce new drugs. The resources required to invest in the search for new molecules, conduct clinical trials and market the drug was huge and only large pharmaceutical firms could invest in these activities extensively. Thus the main reasons for the strategic consolidation of the pharmaceutical industry are: lack of new products, globalization of the world economy, high R&D costs, large investments on global sales and marketing activities, increased competitiveness, reforms in the world healthcare, increased importance of regulation in the global context.

Strategies for Growth

Strategic actions that have been discussed in pharmaceutical literature can be categorized as corporate, global, network, marketing, research & development and investment strategies (*Langley, 2005*). Companies can adopt different strategies based on their strategic orientation and business plans. The growth strategy concentrates on growth of the organization and the various types of growth strategies can be categorized under six heads based on their strategic action points and implications.

Grand Strategies Implemented by Pharmaceutical firms 2001- 2002

1	Organic concentration (market penetration)
2	Co operative concentration (market penetration)
3	Organic market development
4	Cooperative market development
5	Organic product development (R&D)
6	Cooperative market development (R&D)
7	Acquisition based product development
8	Organic innovation (R&D)
9	Cooperative innovation (R&D)
10	Organic innovation (Information Technology)
11	Cooperative innovation (Information Technology)
12	Horizontal integration
13	Vertical integration
14	Joint venture
15	Organic concentric diversification
16	M&A Concentric diversification
17	Conglomerate diversification
18	Turnaround / organic growth / retrenchment
19	Divestment
20	Liquidation
21	External finance raising
Source : Compiled from Langley et al (2005)	

Strategic Alliance between Indian and Foreign Pharmaceutical Companies

Over the years the Indian pharmaceutical companies have used multiple strategies to build the pharmaceutical industry in India. According to *Sampath (2005),* the major strength of the Indian pharmaceutical company was the cost competitive manufacturing base and the extensive skill in chemistry. He has identified the strategies adopted by Indian firms as:

- R&D Strategies
- Competitive strategies
- Collaborative strategies

The R&D strategies of Group 1 firms are driven by the need for entry and establishment in the regulated markets. Hence the strategy would be greater investment into R&D to

generate innovative generic products, process and bulk drugs. Group 2 firms are driven by the need to strengthen competitive advantages, make use of CRAM opportunities, to take advantage of the business. Their strategic orientation would be towards generating active supply of off- patent generics to the unregulated and semi regulated markets and establish themselves as niche players in contract research, by choosing specific areas like – clinical research, domestic marketing etc. Group 3 firms are driven by the need to survive in the scenario of complete TRIPS compliance, thus leading towards the up gradation of facilities to continue being outsource centers for Group 1 and 2 firms. The competitive strategies adopted by Indian companies are centered around R&D involving research on new chemical entities, non infringing processes, novel drug delivery systems generics and specialty generics for regulated market and biopharmaceutical research.

Factors that Impact Strategic Alliances

Parvartiyar and Gupta (1994), discusses the benefits sought by Indian companies as:

Reasons for Alliances

1. Governmental Policy related factors
i. Intellectual properties
ii. Deregulation and Economic liberalization
2. Gaining competitive advantage
i. Growth strategy
ii. Mimic competition
iii. Gain access to key attributes
3. Globalization
i. New market access
ii. International harmonization of standards
4.**Cost related aspects**
i. Cost of production
ii. Cost of R&D
iii. Cost of marketing and distribution
5. Innovations
i. Achieve high profits
ii. Achieve vertical integration
6. Technology and knowledge management related

i. Rapid advances in technology – related to lifescience
ii. Increasing role of information technology
iii. Strategic importance of speed

Impact of Strategic Alliances

Alliances, which are a consequence of growth strategy and which are clearly envisioned and implemented, can prove to be beneficial to both the alliance partners.

Impact of Alliances on Business Aspects of Pharmaceutical Companies

1. Product
i. New product development
ii. New product launches – domestic and international markets
iii. Enhanced product portfolio
2. Marketing
i. Access to new markets
ii. Enhanced sales promotional activities and spend
iii. New distribution channels
3 Technology
i. Access to new technology
ii. R&D capability
iii. GMP manufacturing facilities knowhow
4 Manufacturing
i. Cost optimization
ii. Quality management techniques
iii. Common asset and operational synergy
5 Competitive advantage
i. Increased market share
ii. Increased profitability
iii. Intellectual and managerial skills

Success Factors for Alliances

Two types of uncertainties in alliances: uncertainty regarding future events and uncertainty regarding partner's responses to those future events. Alliances involve considerable investment of resources and need to be nurtured and managed well, if they are to be successful.

Strategic fit involves six drivers, sharing a common vision, having a compatibility of strategies, mutual dependency, market acceptability of the alliances, should add value for the partners and their customers, and finally the alliance should be of strategic importance to both the partners. The drivers for organizational fit includes: addressing organizational similarities and differences in the alliance, providing for strategic and organizational flexibility, reducing the design complexity, enabling effective management control by both partners, overcoming potential strategic conflicts and enabling partners achieve their strategic objectives.

Factors Affecting the Success of Alliances

1. External factors
i. Legal and regulatory policies
ii. Currency related aspects
2. Strategic fit
i. Strategic fit
ii. Organisational fit
iii. Cultural fit
3. Governance
i. Day to day operations
ii. Communication
4. Trust
i. Formal and informal relationships
ii. Collaborative activities

Conclusion and Research Gaps:

Strategic alliance between Indian and foreign pharmaceuticals is a phenomenon that is here to stay for many more years in the future. Literature has discussed extensively the driving factors for the alliances and the trend of alliances in the 5 decades starting from 1960 till 2010.Research gaps can be summarized as follows:

Literature Gaps

Literature Gaps Identified
1. Trends Strategic alliances between Indian and foreign pharmaceutical companies
i. No decade wise analysis

ii. Data is available till 2006 only
iii. No study on the objectives of the alliances is available
2. Factors that have led to formation of alliances between Indian and foreign pharmaceutical firms
i. Role of technological factors in alliance formation
ii. Role of economic factors in alliance formation
iii. Role of competitive advantage related aspects in alliance formation
3. Business implications of strategic alliances between Indian and foreign pharmaceutical firms
i. The major business area impacted during an alliance
ii. Impact of alliance on marketing elements
iii. Impact of alliances on the People of the firms who have formed an alliance
4. Factors that are critical for a successful alliance between Indian and foreign pharmaceutical firms
i. Critical success factors with respect to Indian context
ii. Beneficial aspects of alliances to Indian firms
iii. Negative fallouts of alliances with regards to Indian pharmaceutical industry

RESEARCH METHODOLOGY

Research Objectives

The research objectives are derived from the gaps in literature review. The research questions are some of the key aspects to which the answers need to be sought. Both the aspects of the research are illustrated in the table below.

1. To study the factors that influence Indian pharmaceutical companies to form strategic alliances with foreign pharmaceutical firms.

2. To study the impact of the strategic alliances between Indian and foreign pharmaceutical companies on various business aspects of the Indian pharmaceutical firm.

3. To formulate strategies for Indian pharmaceutical companies to avail maximum benefit, from the alliances undertaken with foreign pharmaceutical companies.

Scope of the Research

The research study analyses the alliances that have happened between Indian and foreign pharmaceutical companies. The period under consideration is the last 5 decades that is, from 1950-2009. It traces the evolution of the Indian pharmaceutical industry over the

years and also draws a comparison with the global pharmaceutical firms. The study tracks the alliances of 5 major Indian pharmaceutical companies, along with the reason for the alliance. Empirical study is conducted to understand the impact of alliances on various aspects of the business: Product, Marketing, Technology, Manufacturing and Competitive Advantage. Personal interviews of CEOs/ MDs of Indian pharmaceutical companies gives an idea on the various critical parameters that impact alliance formation and the areas that are impacted during an alliance.

The study does not discuss the alliances happening in other countries, especially between firms in developed countries. The study does not study each of the alliance in detail and analyze the success or failure of the alliance. It does not discuss the alliance outcomes in relation to business goal achievements, impact on turnover etc.

Research Questions

Research Questions	Data
What are the factors that influence the formation of strategic alliance between Indian and foreign pharmaceutical firms ?	Primary data
What are the major business implications of strategic alliances between Indian and foreign pharmaceutical alliances?	Primary data
What are the hindrances for strategic alliances between Indian and foreign pharmaceutical companies?	Primary data

Variables and Literature References

Factors that Motivate Indian Pharmaceutical Companies to form Alliances with Foreign Companies		
	Factors	Literature References
1	Access to global markets	*Pradhan Jaya Prakash (2007), Pradhan and Abraham (2005), Parvatiyar Atul and Gupta P. Yash (1994), Smith Sean Eric (2000)*
2	Access to new technology	*Greene William (2007), Feinberg e. Susan and Majumdar K. Sumit(2001), Chaturvedi Kalpana and Chataway Joanna (2006), Parvatiyar Atul and Gupta P. Yash (1994) , Smith Sean Eric (2000)*

3	Access to foreign distribution network	*Parvatiyar Atul and Gupta P. Yash (1994)*
4	Access to USFDA approved manufacturing facilities	*Greene William (2007), Pradhan and Abraham (2005*
5	Strengthen product portfolio	*Nerkar Atul and Roberts Peter (2004), Mueller M. Janice (2007)*
6	Acquire marketing knowhow	*Smith Sean Eric (2000)*
7	Access to highly regulated markets	*Pradhan JayaPrakash(2005), Pradhan and Abraham (2005*
8	Collaborative R&D	*R. Narula and J. H. Dunning (1998), Chaturvedi Kalpana and Chataway Joanna (2006)*
9	Overall cost minimization	*Smith Eric (2000), Pradhan Jaya Prakash (2007)*
10	Improve market positions	*Hess Jon (2005), Brian S Silverman , Joel A C Baum (2002)*
11	Exploit common assets	*Mowery C. David , Oxley E. Joanne, Silverman S. Brian (1996), Pradhan Jaya Prakash (2007)*
12	Develop financial strength	*Chaturvedi Kalpana and Chataway Joanna (2006)*
13	Establish a brand name abroad	*Pradhan Jaya Prakash (2007)*
14	Access to worldwide information on latest technology and products	*Parvatiyar Atul and Gupta P. Yash (1994)*
15	Managerial knowhow – access to superior managerial skills	*Parvatiyar Atul and Gupta P. Yash (1994)*
16	Access to superior Quality management systems	*Parvatiyar Atul and Gupta P. Yash (1994)*

Impact of the Alliance between Indian and Foreign Pharmaceutical Companies		
	Factors	Literature References
1	Launch new patented molecules	*Nerkar Atul and Roberts Peter (2004), Mueller M. Janice (2007), Kiran Ravi and Mishra Sunita (2009)*
2	Launch new generic molecules in the foreign markets	*Smith Eric (2000), Mueller M. Janice (2007), Gehl Sampath (2005)*
3	Gain access to highly regulated market	*Greene William (2007), Parvatiyar Atul and Gupta P. Yash (1994), Gehl Sampath (2005)*
4	Achieved R&D capability	*Linton Katherine Connor and Corrado Nicholas (2007), Kiran Ravi and Mishra Sunita (2009), Bower D. Jane and Sulej C. Julian (2007), Gehl Sampath (2005)*
5	Gain access to new technology	*Feinberg E. Susan and Majumdar K. Sumit(2001), Parvatiyar Atul and Gupta P. Yash (1994), Kiran Ravi and Mishra Sunita (2009)*

6	Gain capability to invest in marketing and sales promotional activities	*Chitoor Raveendra, Ray Sougata, Aulakh s. Preet, Sarkar M. B. (2008)*
7	Gain GMP compliant manufacturing capabilities	*Parvatiyar Atul and Gupta P. Yash (1994), Gehl Sampath (2005)*
8	Achieve cost minimization	*Linton Katherine Connor and Corrado Nicholas (2007)*
9	Achieve increased market share	*Pradhan and Abraham (2005), Chaturvedi Kalpana and Chataway Joanna (2006), Parvatiyar Atul and Gupta P. Yash (1994)*
10	Achieve increased profitability	*Chitoor Raveendra, Ray Sougata, Aulakh s. Preet, Sarkar M. B. (2008), Kiran Ravi and Mishra Sunita (2009), Bower D. Jane and Sulej C. Julian (2007)*
11	Exploit common assets	*Pradhan and Abraham (2005), Gehl Sampath (2005)*
12	Gain enhanced product portfolio	*Pradhan JayaPrakash (2007), Nerkar Atul and Roberts Peter (2004), Mueller M. Janice (2007)*
13	Establish a brand name abroad	*Pradhan Jaya Prakash (2007)*
14	Access to worldwide information - latest advancements in technology and products	*Parvatiyar Atul and Gupta P. Yash (1994)*
15	Enabled Managerial knowhow – access to superior management systems	*Parvatiyar Atul and Gupta P. Yash (1994)*
16	Access to superior Quality systems	*Parvatiyar Atul and Gupta P. Yash (1994)*

Hypotheses

1 : RELATED TO IMPACT ON PRODUCTS

Impact of Strategic alliances between Indian and foreign pharmaceutical companies on the launch of new patented molecules.

H01: There is no significant difference in the mean value of launch of new patented molecules as an area if impact of strategic alliances between Indian and foreign pharmaceutical companies across the types of Indian pharmaceutical companies.

H02: There is no significant difference in the mean value of launch of patented molecules as an area of impact of strategic alliances between Indian an foreign pharmaceutical companies , across the types of activity undertaken by Indian pharmaceutical companies.

H03: There is no significant difference in the mean value of launch of patented molecules as an area of impact of strategic alliances between foreign pharmaceutical companies, across Indian pharmaceutical companies of differing turnover.

Impact of Strategic alliances between Indian and foreign pharmaceutical companies on the launch of generic pharmaceutical products in India.

H04: There is no significant difference in the mean value of launch of generic pharmaceutical products abroad as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies.

H05: There is no significant difference in the mean value of launch of generic pharmaceutical products abroad as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across the types of activity undertaken by Indian pharmaceutical companies.

H06: There is no significant difference in the mean value of launch of generic pharmaceutical products abroad as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of varying turnover.

Impact of Strategic Alliances between Indian and foreign pharmaceutical companies on the launch of generic pharmaceutical products abroad.

H07: There is no significant difference in the mean value of launch of new generic pharmaceutical products in the domestic market as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies on the, across the types of Indian pharmaceutical companies.

H08: There is no significant difference in the mean value of launch of new generic pharmaceutical products in the domestic market as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies across the types of activity undertaken by Indian pharmaceutical companies.

H09: There is no significant difference in the mean value of launch of new generic pharmaceutical products in the domestic market as an area of impact of strategic alliances between foreign pharmaceutical companies, across Indian pharmaceutical companies with different turnovers.

Impact of Strategic alliances with foreign pharmaceutical companies on gaining a wider product portfolio

H010: There is no significant difference in the mean value of expansion of product portfolio as an area impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies.

H011: There is no significant difference in the mean value of expansion of product portfolio as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies indulging in various activities.

H012: There is no significant difference in the mean value of expansion of product portfolio as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of varying turnover.

2: RELATED TO IMPACT ON MARKETING ASPECTS

Impact of Strategic Alliances between Indian and foreign pharmaceutical companies on gaining access to highly regulated markets abroad

H013: There is no significant difference in the mean value of gaining access to highly regulated markets abroad as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies.

H014: There is no significant difference in the mean value of gaining access to highly regulated markets abroad as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies undertaking different activities

H015: There is no significant difference in the mean value of gaining access to highly regulated markets abroad as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies across Indian pharmaceutical companies of different turnover

Impact of Strategic Alliances between Indian and foreign pharmaceutical companies on gaining capability to invest in sales and marketing.

H016: There is no significant difference in the mean value of gaining investment capability into sales and marketing as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies.

H017: There is no significant difference in the mean value of gaining investment capability into sales and marketing , as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical with varying business activities.

H018: There is no significant difference in the mean value of gaining investment capability into sales and marketing, as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies with varying turnover

Impact of Strategic Alliances between Indian pharmaceutical companies on gaining access into foreign distribution networks abroad.

H019: There is no significant difference in the mean value of gaining access to foreign distribution networks abroad as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies.

H020: There is no significant difference in the mean value of gaining access to foreign distribution networks abroad as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies with differing turnover

H021: There is no significant difference in the mean value of gaining access to foreign distribution networks abroad as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, Indian pharmaceutical companies undertaking different activities

3: RELATED TO IMPACT ON TECHNOLOGY

Impact of Strategic Alliances between Indian and foreign pharmaceutical companies on gaining access to new technology,

H022: There is no significant difference in the mean value of gaining technological competency as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies.

H023: There is no significant difference in the mean value of gaining technological competency as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies indulging in various activities.

H024: There is no significant difference in the mean value of gaining technological competency as an area impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of varying turnover.

Impact of Strategic Alliances between Indian and foreign pharmaceutical companies on achieving R&D capability.

H025: There is no significant difference in the mean value of achieving R&D capability, as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies

H026: There is no significant difference in the mean value of achieving R&D capability, as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies indulging in various activities.

H027: There is no significant difference in the mean value of achieving R&D capability, as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of varying turnover.

Impact of Strategic alliances between Indian and foreign pharmaceutical companies on gaining access to the latest information on technological and product related upgrades.

H028: There is no significant difference in the mean value of accessibility of Indian companies to latest technological and product related upgrades as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies on, across all types of Indian pharmaceutical companies.

H029: There is no significant difference in the mean value of accessibility of Indian companies to latest technological and product related upgrades as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of different turnover.

H030: There is no significant difference in the mean value of accessibility of Indian companies to latest technological and product related upgrades as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies with different activities.

Impact of Strategic alliances between Indian and foreign pharmaceutical companies on gaining GMP compliant manufacturing sites.

H031: There is no significant difference in the mean value of development of GMP compliant production capacities by Indian pharmaceutical companies as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies.

H032: There is no significant difference in the mean value of development of GMP compliant production capacities by Indian pharmaceutical companies as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies performing different activities.

H033: There is no significant difference in the mean value of development of GMP compliant production capacities by Indian pharmaceutical companies as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of different turnover.

4: RELATED TO IMPACT ON MANUFACTURING

Impact of Strategic Alliances between Indian pharmaceutical companies on cost optimization.

H034: There is no significant difference in the mean value of cost optimization as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies across the types of Indian pharmaceutical companies.

H035: There is no significant difference in the mean value of cost optimization as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies across the types of activity undertaken by Indian pharmaceutical companies.

H036: There is no significant difference in the mean value of cost optimization as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies across Indian pharmaceutical companies of varying turnover.

Impact of Strategic Alliances between Indian pharmaceutical companies on exploiting common assets.

H037: There is no significant difference in the mean value of achieving operational synergy as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies across the types of Indian pharmaceutical companies.

H038: There is no significant difference in the mean value of achieving operational synergy as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies across the types of activity undertaken by Indian pharmaceutical companies. .

H039: There is no significant difference in the mean value of achieving operational synergy as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies across Indian pharmaceutical companies of varying turnover.

Impact of Strategic Alliances between Indian and foreign pharmaceutical companies on gaining superior quality management skills.

H040: There is no significant difference in the mean value of quality related skills acquired by Indian pharmaceutical companies, as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies.

H041: There is no significant difference in the mean value of quality related skills acquired by Indian pharmaceutical companies, as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of different turnover.

H042: There is no significant difference in the mean value of quality related skills acquired by Indian pharmaceutical companies, as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies with different activities.

5: RELATED TO IMPACT ON COMPETITIVE ADVANTAGE

Impact of Strategic Alliance between Indian and foreign pharmaceutical companies on increased market shares,

H043: There is no significant difference in the mean values of increased market share as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies.

H044: There is no significant difference in the mean values of increased market share as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies indulging in various activities.

H045: There is no significant difference in the mean value of increased market share as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of differing turnovers.

Impact of Strategic Alliances between Indian and foreign pharmaceutical companies on increase in overall profitability.

H046: There is no significant difference in the mean value of on enhanced profitability as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of differing company types.

H047: There is no significant difference in the mean value of on enhanced profitability as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies indulging in various activities.

H048: There is no significant difference in the mean value of on enhanced profitability as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of differing turnovers.

Impact of Strategic Alliances between Indian and foreign pharmaceutical companies on establishing new brands in the global market,

H049: There is no significant difference in the mean value of establishment of Indian pharmaceutical brand names in the global market *as an area of* impact of strategic alliances between Indian and foreign pharmaceutical companies, across the types of activities undertaken by Indian pharmaceutical companies.

H050: There is no significant difference in the mean value of establishment of Indian pharmaceutical brand names in the global market as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across the types of Indian pharmaceutical companies.

H051: There is no significant difference in the mean value of establishment of Indian pharmaceutical brand names in the global market as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of varying turnover.

Impact of Strategic alliances between Indian and foreign pharmaceutical companies on acquiring superior managerial skills.

H052: There is no significant difference in the mean values of acquisition of management skills by Indian pharmaceutical companies as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies on the, across all types of Indian pharmaceutical companies.

H053: There is no significant difference in the mean value of acquisition of management skills by Indian pharmaceutical companies as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of different turnover.

H054: There is no significant difference in the mean value of acquisition of management skills by Indian pharmaceutical companies as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across pharmaceutical companies indulging in various activities.

Research Design

The exploratory study was conducted with the following objectives in mind,

- Establish the research questions
- Establish the hypotheses

Method of exploratory study:

Here the exploratory research is qualitative in nature and was executed by:

- Secondary data analysis
- Experience survey

Secondary data analysis involved extensive literature review which includes articles and publication which were related to the study topic. Additionally annual reports of Indian companies, news paper articles, reports from business consultants like KPMG and McKinsey became sources of information which helped to crystallize the research questions.

Experience surveys which were designed to seek out important ideas and concepts on the strategic alliances between Indian and foreign pharmaceutical companies was undertaken. The participants in the exploratory surveys were the top executives of Indian pharmaceutical

companies who had undertaken alliances with foreign pharmaceutical companies. The sample size was limited to 4 participants only.

. ***Sampling***

The sample population for this study is derived from the list of Indian pharmaceutical companies registered in recognized databases namely IDMA and OPPI. The IDMA has 300 registered members and includes companies dealing with pharmaceutical manufacturing. The sample would consist of firms which have undergone strategic alliances with another foreign firm. The respondents will be:

- Top executives of pharmaceutical companies in India

Top executives here refers to the senior managers in Marketing , CEO, MD, Heads of R&D , Heads of Production, Executives from Strategy and Development and other functions who are privy to high level activities like alliances and acquisitions. The inputs from the top executives of pharmaceutical companies in India, gives a complete perspective of the strategic alliances between Indian and foreign pharmaceutical companies.

Sample frame:

The sample frame for the top executives in pharmaceutical companies of Indian origin extends to across India irrespective of the turnover, type and activity of the company. The database was acquired from the Indian Drug Manufacturer's Association (IDMA), which is a registry for Indian pharmaceutical companies.

Sampling method:

The database of firms that have undertaken strategic alliance was created. This included a number of 250 Indian companies. From this overall number companies were selected randomly to administer the questionnaire.

Questionnaire

The primary data is collected with the help of a specific questionnaire. The questionnaire is designed to gather the reasons for alliances between Indian and foreign pharmaceutical companies and understand the outcome of the alliances. The questionnaire is divided into 4 sections.

The 1st section has 15 variables. Each variable corresponds to each factor that has influenced the formation of strategic alliances between Indian and foreign pharmaceutical companies. The variables are derived from literature references.

The 2nd section has 18 variables. This is aimed at gathering data from the responding pharmaceutical firms on their experience with strategic alliances that they have undertaken with foreign pharmaceutical companies.

The 3rd section, has 6 factors which are identified as the possible hindrances in the formation of strategic alliances in the Indian context.

The 4th section aims at gathering firm specific data. The descriptive analyses of the responding firm, will contain data relating to the Type of company, type of activity of the responding company and turnover of the responding company.

Scale and Design:

Convergent and discriminant validity of the scales were Weak and bad items from the original construct were redefined. The resulting construct was subjected to preliminary test followed by a pilot scale field test. The Questionnaire is designed as per Likert scale, thus the level of variables are ordinal. The data scale has order but no magnitude and is a categorical data. The Non parametric tests will be used for hypotheses testing.

Method of Analysis and Justification

The scale of measurement for the data collected is nominal in nature, and hence non-parametric. Random sampling method was used for data collection. Hypotheses were tested using single and multiple variables.

The variables chosen were:

- Type of pharmaceutical companies (API, Formulations, R&D, Clinical Research)

- Type of activities of the pharmaceutical companies (Manufacturing, R&D , Contract Research, Distribution)
- Turnover of the pharmaceutical companies (<100 cr, 100-300Cr, 300-500 cr, >500cr annually)

The groups are independent, that is presence of the members in one group is not dependent upon membership in another . The statistical techniques that were used are:

- Non parametric tests which assesses the population distribution
- One sample tests to understand the aspects which drive strategic alliances between Indian and foreign pharmaceutical companies
- K- sample tests to evaluate the variables for the three groups from the population
    - One way Analysis of Variance (ANOVA)
- Correlation to assess the correlation between scale variables
- Regression to predict a model fit

Limitations of the Research

The study does have certain limitations which are enumerated as follows:

- *Time span:* The research considers the strategic alliance between Indian and foreign pharmaceutical companies in the last 4 decades till 2010.
- *Sampling limitations:* Inadequate representations under the various categories of the pharmaceutical companies.
- *Gaps in data:* In India there is no single database which records all the alliances that have happened in the Indian pharmaceutical industry in the last few decades. The compilation was done through secondary data from journals, newspapers and articles. There are possibilities that all the alliances between companies may not have been recorded.

Analysis and Interpretation of Results

Reasons for the Formation of Alliances between Indian and Foreign Pharmaceutical Companies

No	Mean	SD	Rank

1	Strengthen product portfolio	3.83	.62	6
2	Establishing brands abroad	3.94	.76	4
3	Launching new product lines	3.76	.71	8
4	Entering global emerging markets	3.83	.62	7
5	Entering regulated markets	3.94	.76	3
6	Establishing distribution channels abroad	3.76	.71	9
7	Accessing new technology	3.32	.64	10
8	Undertaking collaborative R&D	3.30	.90	11
9	Obtaining USFDA approved	3.17	.93	13
10	Cost minimization	2.91	.90	14
11	Achieving operational synergy	2.86	.91	15
12	Achieving quality management	3.28	.67	12
13	Achieving market position	3.91	.72	5
14	Achieving financial power	3.98	.69	2
15	Enhancing company image	4.04	.71	1

Impact of Strategic Alliances between Indian and Foreign Pharmaceutical Companies on Indian Pharmaceutical Companies

No	*Null Hypotheses*	Level of Sig.	Outcome
H01	There is no significant difference in the mean value of launch of new patented molecules as an area if impact of strategic alliances between Indian and foreign pharmaceutical companies across the types of Indian pharmaceutical companies	0.061	Supported
H02	There is no significant difference in the mean value of launch of patented molecules as an area of impact of strategic alliances between Indian an foreign pharmaceutical companies, across the types of activity undertaken by Indian pharmaceutical companies	0.002	*Not supported*
H03	There is no significant difference in the mean value of launch of patented molecules as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of differing turnover	0.005	*Not supported*
H04	There is no significant difference in the mean value of launch of generic pharmaceutical products abroad as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies	0.102	Supported
H05	There is no significant difference in the mean value of launch of generic pharmaceutical products abroad as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies indulging in various activities	0.010	*Not supported*
H06	There is no significant difference in the mean value of launch of generic pharmaceutical products abroad as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of varying turnover	0.001	*Not supported*
H07	There is no significant difference in the mean value of launch of new generic pharmaceutical products in the domestic market as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across the types of Indian pharmaceutical companies	0.201	Supported

H08	There is no significant difference in the mean value of launch of new generic pharmaceutical products in the domestic market as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies across the types of activity undertaken by Indian pharmaceutical companies	0.056	Supported
H09	There is no significant difference in the mean value of launch of new generic pharmaceutical products in the domestic market as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies with different turnovers	0.048	*Not supported*
H010	There is no significant difference in the mean value of expansion of product portfolio as an area impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies	0.165	Supported
H011	There is no significant difference in the mean value of expansion of product portfolio as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies indulging in various activities	0.005	*Not supported*
H012	There is no significant difference in the mean value of expansion of product portfolio as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of varying turnover	0.110	Supported
H013	There is no significant difference in the mean value of access to highly regulated markets abroad as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies	0.697	Supported
H014	There is no significant difference in the mean value of access to highly regulated markets abroad as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies undertaking different activities	0.096	Supported
H015	There is no significant difference in the mean value of access to highly regulated markets abroad as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies across Indian pharmaceutical companies of different turnover	0.191	Supported
H016	There is no significant difference in the mean value gaining investment capability into sales and marketing as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies	0.000	*Not supported*
H017	There is no significant difference in the mean value of gaining investment capability into sales and marketing, as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical with varying business activities	0.000	*Not supported*
H018	There is no significant difference in the mean value of gaining investment capability into sales and marketing, as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies with varying turnover	0.001	*Not supported*
H019	There is no significant difference in the mean value of gaining access to foreign distribution networks abroad as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies	0.001	*Not supported*
H020	There is no significant difference in the mean value of gaining access to foreign distribution networks abroad as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies with differing turnover	0.015	*Not supported*
H021	There is no significant difference in the mean value of gaining access to foreign distribution networks abroad as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, Indian pharmaceutical	0.000	*Not supported*

	companies undertaking different activities		
H022	There is no significant difference in the mean value of gaining technological competency as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies	0.691	Supported
H023	There is no significant difference in the mean value of gaining technological competency as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies indulging in various activities	0.139	Supported
H024	There is no significant difference in the mean value of gaining technological competency as an area impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of varying turnover	0.301	Supported
H025	There is no significant difference in the mean value of achieving R&D capability, as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies	0.039	*Not supported*
H026	There is no significant difference in the mean value of achieving R&D capability, as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies indulging in various activities	0.001	*Not supported*
H027	There is no significant difference in the mean value of achieving R&D capability, as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of varying turnover	0.024	*Not supported*
H028	There is no significant difference in the mean value of development of GMP compliant production capacities by Indian pharmaceutical companies as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies	0.014	*Not supported*
H029	There is no significant difference in the mean value of development of GMP compliant production capacities by Indian pharmaceutical companies as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies performing different activities	0.023	*Not supported*
H030	There is no significant difference in the mean value of development of GMP compliant production capacities by Indian pharmaceutical companies as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of different turnover	0.035	*Not supported*
H031	There is no significant difference in the mean value of accessibility of Indian companies to latest technological and product related upgrades as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies on, across all types of Indian pharmaceutical companies	0.001	*Not supported*
H032	There is no significant difference in the mean value of accessibility of Indian companies to latest technological and product related upgrades impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of different turnover	0.064	Supported
H033	There is no significant difference in the mean value of accessibility of Indian companies to latest technological and product related upgrades as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies , across Indian pharmaceutical companies with different activities	0.000	*Not supported*
H034	There is no significant difference in the mean value of cost optimization as an area of impact on strategic alliances between Indian and foreign pharmaceutical companies, across the types of Indian pharmaceutical companies	0.304	Supported

H035	There is no significant difference in the mean value of cost optimization as an area of impact on strategic alliances between Indian and foreign pharmaceutical companies, across the types of activity undertaken by Indian pharmaceutical companies	0.184	Supported
H036	There is no significant difference in the mean value of cost optimization as an area of impact on strategic alliances between Indian and foreign pharmaceutical companies across Indian pharmaceutical companies of varying turnover.	0.232	Supported
H037	There is no significant difference in the mean value of achieving operational synergy as an area of impact on strategic alliances between Indian and foreign pharmaceutical companies across the types of Indian pharmaceutical companies.	0.763	Supported
H038	There is no significant difference in the mean value of achieving operational synergy as an area of impact on strategic alliances between Indian and foreign pharmaceutical companies across the types of activity undertaken by Indian pharmaceutical companies.	0.800	Supported
H039	There is no significant difference in the mean value of achieving operational synergy as an area of impact on strategic alliances between Indian and foreign pharmaceutical companies across Indian pharmaceutical companies of varying turnover	0.528	Supported
H040	There is no significant difference in the mean value of quality related skills acquired by Indian pharmaceutical companies, as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies	0.406	Supported
H041	There is no significant difference in the mean value of quality related skills acquired by Indian pharmaceutical companies, as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of different turnover	0.237	Supported
H042	There is no significant difference in the mean value of quality related skills acquired by Indian pharmaceutical companies, as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies with different activities	0.800	Supported
H043	There is no significant difference in the mean values of increased market share as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies	0.136	Supported
H044	There is no significant difference in the mean values of increased market share as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies indulging in various activities	0.223	Supported
H045	There is no significant difference in the mean value of increased market share as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of differing turnovers	0.185	Supported
H046	There is no significant difference in the mean value of on enhanced profitability as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of differing company types	0.008	*Not supported*
H047	There is no significant difference in the mean value of on enhanced profitability as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies indulging in various activities	0.013	*Not supported*
H048	There is no significant difference in the mean value of on enhanced profitability as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of differing turnovers	0.004	*Not supported*
H049	There is no significant difference in the mean value of establishment of Indian	0.050	Supported

	pharmaceutical brand names in the global market *as an area of* impact of strategic alliances between Indian and foreign pharmaceutical companies, across the types of activities undertaken by Indian pharmaceutical companies		
H050	There is no significant difference in the mean value of establishment of Indian pharmaceutical brand names in the global market as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across the types of Indian pharmaceutical companies	0.107	Supported
H051	There is no significant difference in the mean value of establishment of Indian pharmaceutical brand names in the global market as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of varying turnover	0.027	*Not supported*
H052	There is no significant difference in the mean values of acquisition of management skills by Indian pharmaceutical companies as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies on the, across all types of Indian pharmaceutical companies	0.166	Supported
H053	There is no significant difference in the mean value of acquisition of management skills by Indian pharmaceutical companies as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of different turnover	0.194	Supported
H054	There is no significant difference in the mean value of acquisition of management skills by Indian pharmaceutical companies as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across pharmaceutical companies indulging in various activities	0.010	*Not supported*

for Formation of Strategic Alliances between Indian and Foreign Pharmaceutical Companies on Indian Pharmaceutical Companies

No	*Variable*	Mean	SD	Rank
1	Lack of data related to organizations and their interests	3.38	.98	*5*
2	Lack of governmental policies and	3.52	.80	*4*
3	Unclear alliance objectives of Indian pharmaceutical companies regarding alliance formation	3.34	.73	*6*
4	Lack of communication among between alliancing Indian and foreign pharmaceutical companies	3.71	.73	*2*
5	Lack of alliance progress monitoring between Indian and foreign pharmaceutical companies	3.68	.66	*3*
6	Lack of Trust among alliancing companies	3.79	.79	*1*

Correlation				
Factors	Variables	Correlation	Influence	R square
Product	Strengthen product portfolio	.343	Moderate	.126
	Establish brands abroad	.280	Moderate	
	Launch new products	.066	Low	

Marketing	Global emerging markets	.328	Moderate	.159
	Regulated markets	.345	Moderate	
	Distribution channels abroad	.259	Moderate	
Technology	Access new technology	.025	Low	.095
	Collaborative R&D	.300	Moderate	
	USFDA approvals	.134	Low	
Manufacturing	Cost minimization	-.138	Low	.108
	Common assets	.162	Low	
	Quality management	-.162	Low	
Competitive Advantage	Market position	.063	Low	.145
	Financial power	.315	Moderate	
	Image	.296	Moderate	

a. *Factors that influence Indian pharmaceutical companies to form strategic alliances with foreign pharmaceutical firms.*

b. *Impact of the strategic alliances between Indian and foreign pharmaceutical companies on various business aspects of the Indian pharmaceutical firm.* \

c.

Factors	Variables	Correlation	Impact	R square
Product	New patents	.403	High	.277
	New generics abroad	.452	High	
	New generics domestic	.324	Moderate	
	Wide portfolio	.187	Low	
Marketing	Regulated market	.305	Moderate	.278
	Investment capability	.423	High	
	Foreign distribution	.466	High	
Techngy	New technology	.132	Low	.226
	R&D capability	.295	Moderate	
	GMP compliance	.250	Moderate	
	Access to information	.463	High	
Manufacturing	Cost optimization	.261	Moderate	.139
	Common assets	.120	Low	
	Quality management	-.164	Low	
Competitive Advantage	Increased market share	.154	Low	.108
	Increased profits	.229	Moderate	
	Established new brands	.300	Moderate	
	Managerial capabilities	.255	Moderate	

d. *External and Internal hindrances for the formation of strategic alliances between Indian and foreign pharmaceutical companies.*

Factors	Variables	Correlation	Impact	R square
External	Information	-.126	Negative	.198
	Govt. policies	-.063	Negative	
	Unclear objectives	.193	Low	
Internal	Lack of communication	.102	Low	
	Non monitoring of alliance	-.243	Negative	
	Lack of trust	-.012	Negative	

CONCLUSIONS, RECOMMENDATIONS AND DIRECTIONS FOR FUTURE RESEARCH

Conclusions for the Main Research Problem

After analyzing the primary data, the following conclusions can be drawn with reference to reasons for strategic alliances, impact of strategic alliances and the hindrances for strategic alliance between Indian and foreign pharmaceutical companies. However the expected outcome of these factors differs from company to company.

Conclusions Relating to Reasons for Strategic Alliance between Indian and Foreign Pharmaceutical Companies:

- *Strengthen product portfolio*

This research work has indicated that for Indian pharmaceutical companies a driving factor for the formation of Strategic alliances between Indian and foreign pharmaceutical companies is the need to strengthen the existing product portfolio of Indian companies.

Establish new brand abroad

Primary research indicates that Indian pharmaceutical companies look at strategic alliances with foreign pharmaceutical companies, to establish their products and brands in the foreign market. This is also substantiated by *Pradhan (2007).*

Launch new product lines

Research indicates that Indian companies seek alliances with foreign pharmaceutical firms to enable them launch new products in the market.

Enter global emerging markets

Expanding the market by entering new emerging markets is a strong driver for Indian pharmaceutical companies to form strategic alliances with foreign pharmaceutical companies.

- *Enter regulated markets*

Indian pharmaceutical companies consider entry into regulated market like US, UK, European Union as the third most important reason which drives strategic alliances between Indian and foreign pharmaceutical companies.

- *Establish distribution channels abroad*

The need to establish new distribution channels in foreign market which will eventually help in marketing the products, drives strategic alliances between Indian and foreign pharmaceutical companies..

- *Access new technology*

Research indicates that Indian pharmaceutical companies consider gaining access to new technology as a reason that can drive strategic alliances between Indian and foreign pharmaceutical companies.

Undertake collaborative R&D

Indian companies consider collaborative R&D as a driver for strategic alliances between Indian and foreign pharmaceutical companies.

Obtain USFDA approved manufacturing facilities

Pharmaceutical companies in India look at strategic alliances with foreign pharmaceutical companies to gain access to USFDA approved manufacturing facilities.

Cost minimization

Research indicates that cost minimization is a factor that can influence the formation of strategic alliances between Indian and foreign pharmaceutical companies.

Achieve operational synergy

Achieving operational synergy may be a reason for strategic alliances between two firms, however with respect to Indian and foreign pharmaceutical companies, this is not a strong driving factor for Indian pharmaceutical companies to look at strategic alliances with foreign pharmaceutical companies.

- *Achieve quality management*

Gaining knowledge on quality related aspects and managing overall quality is a driver for strategic alliances. However with respect to Indian pharmaceutical companies, this is not a very critical driver for strategic alliances with foreign pharmaceutical companies.

- *Achieve market position*

This research has indicated that achieving high market position is a key factor which drives Indian pharmaceutical companies to form strategic alliances with foreign pharmaceutical companies.

- *Achieve financial power*

The need to have adequate financial power through high profits is a strong driver for Indian pharmaceutical; companies to form strategic alliances with foreign pharmaceutical companies.

Enhance company image

This research indicates that Indian pharmaceutical companies feel that the primary reason for strategic alliances between Indian and foreign pharmaceutical companies is the need to enhance the company image and score on competitive advantage.

Conclusions Relating to Impact of Strategic Alliance

Analysis of the primary data from Indian pharmaceutical companies indicate that strategic alliances between Indian and foreign companies has a direct impact on new patent filing and new product launches from Indian pharmaceutical companies.

- *Strategic alliances and introduction of new patents from Indian pharmaceutical companies*

The response from the Indian companies indicates that there is a strong impact of strategic alliances with foreign pharmaceutical companies on the introduction of new patents by the Indian pharmaceutical companies.

Strategic alliances and launch of generic products abroad

This research indicates that there is a strong impact of strategic alliances with foreign pharmaceutical companies on the launch of generic products abroad in foreign markets.

Strategic alliances and launch of generic products in domestic market

This study indicates that the Indian pharmaceutical companies of varying sizes find that strategic alliances between Indian and foreign pharmaceuticals impact the launch of generic products in the domestic market.

Strategic alliances and enhanced product portfolio

This research indicates that Indian pharmaceutical companies across various pharmaceutical activities like manufacturing R&D, contract manufacturing and distribution, feel the impact of strategic alliances with foreign pharmaceutical companies on their portfolios positively.

Strategic alliances and access to regulated markets

Primary research indicates that strategic alliances between Indian and foreign pharmaceutical companies have a positive influence in helping Indian pharmaceutical companies gain access into regulated markets like US and Europe.

Strategic alliances and investment in sales and marketing

Primary research indicates that strategic alliances between Indian and foreign pharmaceutical companies have a considerable impact in enhancing marketing capability, across all sizes, types and activities of the Indian pharmaceutical company. *Chitoor, Ray and Sarkar (2008)*indicated that alliances enhance investment capabilities among organizations.

. Strategic alliances and access to foreign distribution network.

Primary research indicates that strategic alliances between Indian and foreign pharmaceutical companies have considerably influenced Indian companies, of different sizes, activities and types, to gain access into distribution channels in foreign market.

Strategic alliances and access to new technology

Primary research indicates that strategic alliances between Indian and foreign pharmaceutical companies have no impact on the acquisition of new technology by Indian pharmaceutical companies.

Strategic alliances and achieving R&D capability

Primary research indicates that strategic alliances between Indian and foreign pharmaceutical companies have helped Indian companies achieve R&D capability.Indian pharmaceutical companies are moving from traditional manufacturing related activities towards R&D and research and strategic alliances are proving to be one of the routes that companies are resorting to.

Strategic alliances and GMP compliant production capacities

Primary research indicates that strategic alliances between Indian and foreign pharmaceutical companies have an impact on Indian companies gain GMP compliant capacities

Strategic alliances and access to information

Primary research indicates that strategic alliances between Indian and foreign pharmaceutical companies have helped Indian companies gain access to information.

Strategic alliances and cost optimization

Primary research indicates that strategic alliances between Indian and foreign pharmaceutical companies have no impact on the cost optimisation in the manufacturing activities of Indian pharmaceutical companies.

Strategic alliances and achieving operational synergy

Primary research indicates that Indian pharmaceutical companies have no implication on operational synergy sue to strategic alliances between Indian and foreign pharmaceutical companies .

Strategic alliances and quality management

Primary research indicates that strategic alliances between Indian and foreign pharmaceutical companies have no impact on cost optimisation in their manufacturing activities for Indian companies.

Strategic alliances and increased market share

Many pharmaceutical companies have increased their market shares over the years due to enhanced economic activities, which has increased their turnover and in turn increased their market share.

Strategic alliances and increased overall profitability

Primary research indicates that strategic alliances between Indian and foreign pharmaceutical companies have helped Indian companies achieve overall profitability.

. *Strategic alliances and brand building*

Primary research indicates that strategic alliances between Indian and foreign pharmaceutical companies have helped Indian companies enhance their brand value.

Strategic alliances and acquiring superior managerial skills

Primary research indicates that strategic alliances between Indian and foreign pharmaceutical companies have helped Indian companies acquire superior managerial skills.

Conclusions Relating to Hindrances for Strategic Alliance

There are many factors which hinder the formation and successful progress of an alliance with a foreign pharmaceutical company. For a successful progress these aspects need to be identified and monitored.

External : Lack of information

In this study the respondent consider the lack of information as a strong factor which impedes the formation of strategic alliance between Indian and foreign pharmaceutical companies.

External : Governmental policies

In this study the respondents consider lack of policies, guidelines and governmental support as a key deterrent for the formation of strategic alliances between Indian and foreign pharmaceutical companies.

Internal :Unclear objectives

In the study the respondents indicate that clear objective goes a long way in determining the success of a partnership.

Internal :Lack of communication

. In the current study, the respondents indicate that lack of communication does cause fractures in the alliance which can ultimately lead to failure to achieve the objectives

Internal : Non monitoring of alliances

In this study the respondents indicate that it is critical to monitor the alliance progress and the success of the alliance is dependent how close the top management is involved in the alliance and its progress.

Internal : Lack of trust

The respondents in the study have indicated strongly that lack of trust is a serious threat to the success of any alliance. Trust can be built by communication, interactions, transparency and clarity on the objectives of both the alliancing companies

Recommendations for Indian Pharmaceutical Companies Undertaking Strategic Alliances

Based on the study and analyses of strategic alliance between Indian and foreign pharmaceutical companies, the following strategic orientation can be adopted for Indian pharmaceutical companies.

Indian Pharmaceutical Companies of Different Turnover:

Small pharmaceutical companies

- Concentrate on meeting stringent regulatory norm specified by USFDA, GMP etc. This will help generate new avenue for growth by entering into contract manufacturing for MNCs.
- Develop and upgrade the manufacturing facilities both for capacity enhancement and quality related aspects, this will open up opportunities

Middle tier pharmaceutical companies

- Generic sales particularly to foreign market is a large business segment with scope to grow, Indian pharmaceutical companies should make use of this growth phase. Getting into alliances with MNCs whose drugs are expected to go off patent, can be an approach. This will help in enhancing the capacity of middle tier companies and help them to reach new market and increase their turnover.

- Concentrate on enhancing their production capacities to be able to take advantage of the growing demand for cheaper drugs. This can be achieved by undertaking collaborations with firms both in India and abroad.
- Gain expertise in regulatory requirement across the world, to develop the necessary competency to cater to all the market across the world. This can be achieved by alliance with a partner with adequate market specific experience and knowledge in regulatory requirement and is in compliance.

Large pharmaceutical companies

- Current Indian skill set is in synthetic chemistry. There is scope for growth in area like new lead molecule new target in new area like medicinal biology and protein chemistry. High level of research and new drug development can be achieved with collaboration with MNC.
- Concentrate effort in BioPharma for both regulated and non regulated markets. Indian pharmaceutical companies can enter into collaboration with BioPharma companies to develop new products. This will take top pharmaceutical companies towards innovation.

Indian Pharmaceutical Companies of Different Types of Activities

Manufacturing :

- Develop international grade of manufacturing facilities which can meet stringent regulatory requirements .
- Undertake alliances with Indian and foreign pharmaceutical firms to utilize the capacity to the fullest and undertake contract manufacturing

R&D:

- Develop strategic alliances with research oriented pharmaceutical companies to access latest advancements in science and technology.
- Provide contract research facilities to other pharmaceutical firms

Contract manufacturing :

- Develop manufacturing capacities to high standards to enable international companies get into alliances
- Focus on meeting stringent regulatory norms both domestic and international
- Enhance production capacities to meet the requirement of the off patent drugs

Indian Pharmaceutical Companies of Different Types of Companies:

API :

- Develop capabilities to move upwards the value chain towards the manufacturing of formulations and specialty drugs. Can be achieved by alliances and self development .
- Concentrate on alliances with different pharmaceutical companies to supply and develop new API molecules with the growing demand in the market

Formulations :

- Adopt competencies to move towards specialty drugs and R&D . This can be achieved through alliances with suitable partner
- Invest in R&D
- Invest in development of facilities to meet stringent regulations thereby enhancing prospects in domestic and international market

Clinical Research :

- Develop competencies to meet regulatory requirements across the world to enable more scope of clinical research in India .

Strategies for long term success of alliance

- Alliance should be well thought out and directly should be linked to growth objective .
- Alliances should have a clear monitoring at every stage with roles and responsibilities defined
- Communication should be focused on both e internally and with the alliancing partner

- Trust is developed slowly, and can be enhanced with successful alliances for various aspects

Suggestions

- Government needs to initiate a database of each company about the current alliances and the core competency of each company to help prospective alliances select right allaincing partners.

Future Research Directions

Future Research Direction s are as follows:

- Identify some specific product related factors which are influential. Future research can throw some more light in this direction.
- There is scope for future research to identify more factors that influence strategic alliances between Indian and foreign pharmaceutical companies.
- Future research can throw light on other technological reasons for strategic alliance. This research study indicates a collaborative R&D to be a significant driver for alliances.
- Identify other manufacturing related factors that can influence strategic alliances between Indian and foreign pharmaceutical companies.
- Future research can be directed towards identifying more competitive factors which influence alliance formation between Indian and foreign pharmaceutical companies.
- Strategic alliances has impact on many more aspects of the organization like employees, customers, other alliances etc which are not covered in their research. This can be a future scope of study as this will give the entire picture of the strategic alliance and its impact.
- There are other factors which can be influenced by alliances and this is a scope for future research.
- Future research can analyse the other hindrances for the alliance like employee related aspects, training and learning related aspects and market related aspects.

A STUDY OF STRATEGIC ALLIANCES BETWEEN INDIAN AND FOREIGN COMPANIES WITH REFERENCE TO THE INDIAN PHARMACEUTICAL INDUSTRY

THESIS

SUBMITTED FOR THE AWARD OF THE DEGREE OF

Ph. D. (Business Administration)

BY

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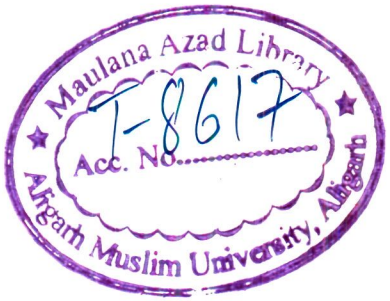
2013



22 OCT 2014

T8617

CERTIFICATE

This is to certify that the thesis entitled "**A Study of Strategic Alliances between Indian and Foreign Companies with reference to the Indian Pharmaceutical Industry**", submitted to the Department of Business Administration, Faculty of Management Studies and Research, Aligarh Muslim University, in partial fulfillment of the requirements for the award of **Doctor of Philosophy in Business Administration** is a record of original work done by **Ms. Veena Priyadharshini**, during the period of her study in the Department under my supervision and guidance. This thesis has not formed the basis for the award of any Degree, Diploma, and Associate ship, Fellowship or other similar title to any candidate of any university.

Dr. Mohd. Afaq Khan

(Supervisor)

CERTIFICATE

This is to certify that the thesis entitled "**A Study of Strategic Alliances between Indian and Foreign Companies with Reference to the Indian Pharmaceutical Industry**", submitted to the Department of Business Administration , Faculty of Management Studies and Research, Aligarh Muslim University, in partial fulfillment of the requirements for the award of **Doctor of Philosophy in Business Administration** is a record of original work done by **Ms. Veena Priyadharshini**, during the period of her study in the Department under my supervision and guidance. This thesis has not formed the basis for the award of any Degree, Diploma, and Associate ship, Fellowship or other similar title to any candidate of any university.

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DECLARATION

I do hereby declare that the thesis titled "**A Study of Strategic Alliances between Indian and Foreign Companies with reference to the Indian Pharmaceutical Industry**", submitted to the Department of Business Administration, Faculty of Management Studies and Research, Aligarh Muslim University, for the degree of Ph.D (Business Administration) is a record of original work done by me, under the supervision and guidance of Dr. Mohd. Afaq Khan, Assistant Professor, Department of Business Administration, Faculty of Management Study and Research, Aligarh Muslim University, Aligarh (Internal Supervisor) and Dr. Sandhya Anvekar, Head Research, M. S. Ramiah Institute of Management, Bangalore (External Supervisor).

It has not, previously formed the basis for the award of any degree, diploma, associate ship, fellowship or other similar title to any candidate of any university.

Place

Date

Signature of the candidate

Veena Priyadharshini

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PREFACE

Increasing levels of competition has increased the costs of doing business substantially. Sustained inflation; heavy costs of developing and commercializing products; regulatory compliance; and globalization have increased marketing costs leading to increase in business expenses across all industries. Pharmaceutical industry in India has grown from virtual non existence in the 1940s to a fast growing, third largest industry in India, which is all set to grow three fold to US $20 billion by 2015. Patent expiry and rising cost pressures encourages the alliance formation of multinational companies with local players in the emerging markets, India being the foremost among them.

Sustainability of a pharmaceutical company is dependent upon the continuity of its new drug pipelines, which is often achieved through acquisition of smaller research driven firms. Small research driven companies lack the capital for product launches and marketing, thus alliances are the directions taken by most companies. India is not far behind in alliance formation. Over the last decade the number of alliances has increased. Most alliances are successful as the objectives are met, many are not.

This empirical study attempts to understand the strategic alliances between Indian and foreign pharmaceutical with a reference to the Indian pharmaceutical industry. It tries to understand the reasons that have led Indian pharmaceutical companies to form strategic alliances with foreign companies over the years. It also tries to estimate the actual implications of the alliances on business related aspects. The study makes an attempt to identify the hindrances for the successful formation of strategic alliances between Indian and foreign pharmaceutical companies.

The study involves development of a research questionnaire with the insights derived from industry experts whose firms have undertaken strategic alliances with foreign pharmaceutical companies. The factors that have influenced the formation was alliances were derived from existing literature and expert opinions. The questionnaire was then administered to top executives of Indian pharmaceutical companies, who have been involved in strategic alliances with foreign companies. The samples were categorized based on the type of pharmaceutical company, the activities undertaken by

the pharmaceutical company and the annual sales turnover of the company. The responses were analyzed using statistical tools on the SPSS software.

Increasing costs and competition has ensured that strategic alliances are a norm of today. Three critical aspects regarding the strategic alliances between Indian and foreign pharmaceutical companies were tested: the factors influencing the formation of alliances between Indian and foreign pharmaceutical companies, the impact of strategic alliances on business aspects of the Indian pharmaceutical company and the hindrances for the formation of strategic alliances between Indian and foreign pharmaceutical companies.

The outcome of this work can help in drawing out some concrete strategies that will enable the Indian pharmaceutical companies gain the maximum out of strategic alliances with foreign pharmaceutical companies. This work will be beneficial to both Indian and foreign pharmaceutical companies, seeking out alliances as it will throw light on the motivating factors for the alliances, expected areas of impact and the hindrances for the alliances. By adopting better objectivity and understanding the roadblocks the success rated of the alliances can be maximized for mutual benefits by the alliancing companies.

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ABBREVIATIONS

Abbreviation	Full expansion
US FDA	United States Federal Drug Authorities
IDMA	Indian Drug Manufacturers Association
OTC	Over the Counter
OECD	Organization for Economic Co-operation & Development
GATT	General Agreement on Trade and Tariffs
WTO	World Trade Organisation
OECD	Organization for Economic Cooperation and Development
UNCTC	United Nations Centre for Transnational Corporations
MNC	Multi National Company
R&D	Research and Development
GNP	Gross National Product
IPA	Indian Patent Act
NDP	New Drug Policy
MRTP	Monopolies and Restrictive Trade Practices Act
OPPI	Organization of Pharmaceuticals Producers of India
EMR	Exclusive Marketing Rights
DCA	Drugs and Cosmetic Act
DCR	Drugs and Cosmetics Rules
HAL	Hindustan Antibiotics Ltd
IDPL	Indian Drugs and Pharmaceuticals Ltd
TRIPS	Trade Related Intellectual Property Rights
CDSCO	Central Drugs Standard Control Organization
DCGI	Drugs Controller General of India
FDA	Food and Drug Administration
ASCI	Advertising Standards Council of India
TMMA	Trade and Merchandise Marks Act
C&F	Clearing and Forwarding
DPCO	Drugs Price Control Order
NPPA	National Pharmaceutical Pricing Authority
AIOCD	All India Organization of Chemists and Druggists
NCE	New Chemical Entity
NDDS	New Drug Delivery Systems
WHO	World Health Organization
UNICEF	United Nations Children's Emergency Fund
FDI	Foreign Direct Investment
JV	Joint Venture
ANDA	Abbreviated New Drug application
DMF	Drug Master File
IP	Intellectual property
CAGR	Cumulative Annual growth rate

CHAPTER 1: INTRODUCTION

1.1 Strategic Alliances

A company can outperform rivals only if it can establish a difference that it can preserve. *Porter(1996)* indicated that the company must deliver greater value to customers or create comparable value at a lower cost in order to create a differentiation. Competitive strategic focus is deliberately choosing a set of activities to deliver unique value to the customer, thereby creating a differentiation in the eyes of the customer, which will prove to be advantageous to the firm.

Increasing levels of competition has increased the costs of doing business substantially. Sustained inflation; heavy costs of developing and commercializing new technologies, processes and products; increased complexity of regulatory compliance; the need to compete on a world-wide basis and the increased marketing costs associated with competing in a mature market have led to increase in business expenses *(Barrie, 1985).* While new technologies have aided large scale international communication and transportation, companies themselves have moved internationally to seek new markets both to obtain new sources of growth outside mature home markets.

Firms are looking at alliance strategies, which can offset, to some extent, some of the high cost/high risk syndrome. Significant change in the business environment due to economic conditions, high costs, the globalization of business and increasing political control has changed the focus of alliance strategies to the point where they are now becoming the rule rather than the exception *(Barrie, 1985).*

1.1.1 Theories of Strategic Alliances

An alliance is defined as any inter-firm co-operation that falls between extremes of discrete, short-term contracts and the complete merger of two or more organizations, (*Contractor & Lorange, 2002).* Alliances can be temporary like licensing agreements which are revoked after

a particular period or permanent as evident by the formation of conglomerates with the mergers of multiple companies.

Alliances can be:

- Horizontal – marketing alliances between companies
- Vertical – R&D efforts of one firm being commercialized by another

There are a number of theories which explain strategic alliances; five approaches which are discussed in the literatures are as follows.

(1) Resource based theory
(2) Strategic behavior theory
(3) Theory of synergy
(4) Transactions costs theory
(5) The theory of mimetic organizations

Tsang (1997), attempted to explain strategic alliance formation from the resource-based approach while he identified five major motives for strategic alliance, namely creation of rents, expansion of resource usage, diversification of resource usage, imitation of resources and disposal of resources. While explaining them he indicated that a firm's resources consist of all its assets, knowledge, organizational structure, procedures, and so forth that are controlled by the firm. These resources are classified into three categories, physical resource, human resource and organizational resource. Physical resources include tangible assets such as land, plant, equipment, finished and semi-finished goods, as well as intangible assets such as brand name, copyright and patent. Human resources include the education, training, experience, relationships, skills, and intelligence of individual staff in a firm. Organizational resources include corporate culture, organizational structure, rules, procedures, management information systems, as well as a firm's relationships with external institutions. He defined strategic alliance as a long-term co-operative arrangement between two or more independent firms that engage in business activities for mutual economic gain. Ricardian rent which is the result of possessing valuable resources such as trade secrets, cutting edge technologies, copyrights and patents are of importance in alliances.

The strategic behavior theory approaches long term profitability by improving the competitive positions against competing firms. Cooperative arrangements through alliances speed up the commercialization process especially in a technology intensive industry. These firms believe in the first mover approach, wherein the first mover can gain access and block the entry of competition. This is critical in the pharmaceutical industry as many companies produce innovative drugs which are patented to allow the company to reap maximum benefits. Additionally, the brand names play a key role as physicians remember the name for a very long time, especially so if the molecule is a new blockbuster or first mover in the market. Strategic behavior posits that firms transact by the mode which maximizes profits through improving a firm's competitive position *vis-a-vis* rivals *(Kogut, 1998).*

The theory of synergy builds on the symbiotic relationships between two firms. This is a mutually beneficial association which can be linked to complementarity of assets. *Shan and Visudtibhan (1990)*, have endorsed that inter-firm cooperative arrangements span a wide spectrum of organizational forms between spot market relationship and complete merger. According to them, the most intuitive explanation for cooperative arrangements is their obvious synergistic effects: risk reduction, economies of scale and scope, production rationalization, and convergence of technology. When the synergies created by pooling the resources of cooperating partners outweigh the hitches in the relationships of the two firms, then cooperative relationships can be created.

Transaction costs theory which was developed *Williamson (1975)*, proposes that firms choose how to transact according to the criterion of minimizing the sum of production and transaction costs. Transaction cost theory posits that firms transact by the mode which minimizes the sum of production and transaction costs. *Kogut (1988)*, indicates that Transaction costs refer to the expenses incurred for writing and enforcing contracts, for haggling over terms and contingent claims, for deviating from optimal kinds of investments in order to increase dependence on a party or to stabilize a relationship, and for administering a transaction.

Theory of mimetic organizations indicates that some organizations enter into alliances only because it has become a fashionable or a common thing to mimic (*McCutchen, 2004*). Mimetic organizations are followers of key strategies in the industry.

1.1.2 Types of Strategic Alliances

Contractor and Lorange (2002), have graphically represented the various alliance possibilities on a relationship based continuum. One time contracts involves those situations wherein the alliancing partners come together for a particular activity or project and do not repeat the

Illustration 1 : Alliances

One time contracts	Relational contracts (Turnkey)	Medium term contractual Relationship (Licensing)	Medium to long term relationship	Equity joint venture	Complete merger or Acquisition

partnership. Relational contracts are those situations where the alliancing partners come together for a turnkey project and may repeat this for future projects. Medium term contractual relationship involves specific long duration activities like licensing, distribution etc. Another long term relationship is equity joint venture. The final piece in the continuum is the complete merger of one company with another.

1.1.3 Alliance Process

Strategic alliances between firms involve interactions between two or more firms which lead to co-evolution driven by a process of co-operation and understanding. The basis for any alliance is in the strategic growth plan of the organization. A typical alliance formation involves the following steps:

- Development of growth strategy for the organization: which is a roadmap of the plans, wherein the need for an alliance will emerge as a key action point.
- Alliance Strategy development: involves studying the feasibility of an alliance focusing on issues and challenges, including aspects of technology, production and people.

- Assessing the partners for the alliance: involves analyzing the alliancing partner's strengths and weakness, understanding the synergies, capability gaps.
- Negotiating the contract: wherein the objectives, responsibilities and expectations are worded in a document format. Aspects of arbitration need to be articulated for clear understanding.
- Alliance operation: is the actual day to day functioning of the alliance. It involves a feedback process which monitors the progress of the alliance and takes up corrective actions wherever required.
- Alliance termination: involves the closure of the alliance after the objectives are met. Sometimes alliance may be terminated due to lack of trust and working relationship between the two organizations.

Hoffmann and Schlosser (2001) have suggested a conceptual framework for the alliance evolution. They are: 1. Strategic analysis and the decision to co-operate, 2. Search for a partner, 3. Designing the partnership, 4. Implementation and management of the partnership, 5. Termination of the partnership.

1.2 Major Types of Strategic Alliances among Pharmaceutical Companies

In the pharmaceutical sector, *McCutchen (2004)* has identified and studied the following categories of strategic alliances.

1. R&D/marketing and licensing wherein one partner receives or shares marketing rights to a product and provides development funding and/or research.

2. Marketing/licensing: In this deal, marketing rights are granted, but no significant funding for research of the product is involved.

3. Acquisitions: An acquisition means that one firm takes over part or all of the assets of another firm.

4. Alliances with equity investment: The terms of the deal include an acquisition of shares.

5. Joint venture wherein the partners form a new entity together, of which each partner owns a certain percentage.

6. Co-promotion: Two or more partners agree to market a product in the same territory using the same brand name.

7. Manufacturing/supply: One partner performs manufacturing for another, or agrees to supply a product to the other. Agreements with companies whose primary business is contract manufacturing are not included.

8. Product acquisition: One company acquires exclusive worldwide rights (or rights for a certain geographic territory) to a product. This differs from a license agreement in that it does not imply an ongoing relationship.

9. Comarketing: Two or more partners will market a product in the same territory under their own distinct brand names.

In the pharmaceutical industry the firms can access new technology either by developing its internal R&D functions or through acquiring technologies from smaller firms. Smaller biotech companies which are developed as the result of innovations are a good source of technology upgradation.

1.3 Strategic Alliances in the Indian Pharmaceutical Industry

Costs of doing business, sustained inflation, heavy expenses involved in product research & development, complexity of regulatory compliance, marketing costs, worldwide business expansion are driving companies towards alliances (*Barrie, 1985*).

Tracing the pharmaceutical alliances over the last 4 decades, indicate that there has been a dramatic surge in the strategic alliances in the last couple of decades. Indian pharmaceutical companies have sought the option of entering into joint ventures or

acquiring a firm in the market of their choice. Thus, over the years they have established manufacturing facilities in various countries across the globe. In the period between1976-88(*annexure 2)* due to prevailing norms, foreign collaborations into India were limited. The trend shows an outward orientation of the then Indian giants. They were very keen to set up manufacturing facilities across various third world countries to take advantage of the local needs. These markets were non-regulated and gaining access to these markets was relatively easy. The nature of the alliances ranged from manufacturing facility acquisition and development to market development, establishing their production facilities either as a joint ventures or wholly owned subsidiaries.

The period 1990-1999 *(annexure 2),* witnessed sweeping reforms in the pharmaceutical industry. India implemented transitory measures for intellectual property protection to meet the WTO obligations. Additionally, the licensing requirements for entry and expansion of the firms were abolished, thus allowing 100 percent inward foreign investment. With the onslaught of competition, domestic companies opened up to new business opportunities abroad and locally. Another interesting aspect in alliances during this period was the surge in the involvement of developed countries. Regulated markets like US and UK became the favorite alliancing partners to top Indian firms.

The pioneers in international strategic alliances during this time were: Ranbaxy Laboratories, Sun Pharmaceuticals and Wockhardt. Ranbaxy acquired Ohm Laboratories in 1995, to develop its presence in the US OTC market and it also supported the manufacturing of its approved abbreviated new drug application products. Sun Pharmaceuticals entered the US generic market by acquiring a 30 percent equity stake in Caraco pharmaceuticals in1997. Wockhardt ventured into the European market by acquiring the UK based Wallis Laboratory in 1998, thus opening the doors to supply its own healthcare products into the UK. During this period, another interesting avenue that surfaced was contract manufacturing. Companies like Ranbaxy, Lupin and Shasun signed contract manufacturing agreements with US based firms.

The period between 2000 and 2005 (*annexure 2),* witnessed large number of trans- border alliances and acquisitions totaling to 49 with an aggregate consideration of $1.3 billion. The

outward alliances involved acquisition of various companies across the globe, by many top Indian firms. The objective behind the alliances ranged from acquiring manufacturing capabilities in regulated market especially for generic products to gaining entry into international markets, through already established local firms. The period also witnessed large number of inward alliances. Many multinational companies from USA, Europe and Japan were involved in collaborative activities with the Indian pharmaceutical companies. An analysis of the alliance objectives indicate new drug development, acquiring manufacturing capabilities of generics, developing new formulations to be the main reasons for the collaboration.

Table No: 1 Alliances between Indian Companies and MNCs post 2006

Indian Company	Year	Foreign Company	Head Quarters	Description
Advinus Therapeutics	2006	Merck	US	Drug development
Suven Life sciences	2006	Eli Lily & Co	US	Drug development
Indus Biosciences	2006	Galapagos NV	Belgium	Integrated chemistry services – DD
GVK Biosciences	2006	Wyeth Pharmaceuticals	US	Synthetic chemistry
Nicholas Piramal	2007	Eli Lilly & Co	US	Development and commercialization
Ranbaxy	2008	Daiichi Sankyo Co Ltd	Japan	
Shantha Biotech	2008	Sanofi Aventis	France	
Dabur	2008	Fresenius Kabi	Singapore	
Strides Aroclab	2008	GSK	UK	Emerging markets
Aurobindo	2009	Pfizer	U S	Generic
Claris Life science	2009	Pfizer	US	Generic in US
Dr Reddy's	2009	GSK	UK	Generic to western mkts
Strides Arcolab	2009	Pfizer	US	
Torrent	2009	AstraZeneca	UK	
Cadila Healthcare	2009	Abbott	US	
Wockhardt	2009	Vetoquinol SA	France	Animal Care Subsidiary
Wockhardt	2009	Abbott Laboratories	U.S.	Nutrition Business
Shantha Biotech	2009	Sanofi Aventis	France	
OrchidChemicals	2009	Hospira		Injectable business
Vendant Drugs and Pharmaceuticals	2009	Perrigo		Company acquisition
Famycare	2009	Mylan Labs	US	15% stake
Piramal Healthcare	2010	Abbott Laboratories	USA	Formulation business with one manufacturing unit

Source : collated from KPMG report – The Indian Pharmaceutical Industry, krc equity research- krc.research@krchoksey.com

Post 2000, the pharmaceutical companies started to enter into alliances both in foreign and domestic markets in an unprecedented scale. The quantum of inward alliances almost doubled between 2000 and 2005, from $48 million to $114million. Trans-border acquisitions totaled at 49 with an aggregate of $1.3 billion.

Table No. 2: Recent Alliances in Indian Pharmaceutical Space

Date	Transaction	Details
May 2009	Pfizer – Aurobindo Pharma	39 generic finished-dose products in the US and 20 in Europe, plus an additional 11 in France. The supply pact later extended for another 60 products for selling in several countries through Asia, Latin America Africa and West Asia
May 2009	Pfizer- Claris Lifesciences	Pfizer entered into a partnership with Claris Lifesciences, an injectable drug maker, to commercialize off-patent drugs in the US, Canada, Australia, New Zealand and Europe
Jan 2010	Pfizer- Strides Arcolab	Strides Arcolab signs a major licensing and supply deal with Pfizer to source 40-patent free medicines mostly injectable cancer therapies for sale in US

Source *- IDFC – SSKI Research, Changing Landscapes – a special report on the World's Top 50 Pharma Companies, www.pharmexec.com,may 2006*

1.4 Strategic Alliances of Top 5 Indian Pharmaceutical Companies

There are several national and international pharmaceutical companies that operate in India. **Ranbaxy Laboratories Limited** is the biggest pharmaceutical manufacturing company in India. The company is ranked at the 8th position among the global generic pharmaceutical companies and has presence in 48 countries including world class manufacturing facilities in 10 countries and serves to customers from over 125 countries. In 1960 Ranbaxy started manufacturing antibiotics and became a public limited company in 1973. Ranbaxy was instrumental in developing new processes for patented drugs which were cost effective and served the domestic Indian markets, thus developing the technological competencies of the firm.

In 1977 and 1983, Ranbaxy entered into joint ventures with Nigeria and Malaysia respectively with the objective of supplying cheap drugs. Additionally these countries had slack patent policies. It further expanded its geographical presence through joint ventures in countries

like Thailand, Canada and China wholly owned subsidiaries in Netherlands and Hong Kong during 1980s -90s.

Table No. 3: Ranbaxy Alliances

Company	Country	Objective
Outbound		
Ohm Laboratories	USA (1995)	Manufacturing
	Lagos (Nigeria)1977	
Guangzhou China	JV (1993)	Manufacturing
RPG (Aventis)	France(2004)	
Bayer	Germany (1999)	Marketing of ciprofloxacin
Bayer	Germany (2000)	Acquires generics business
	Vietnam (2001)	Manufacturing
Nippon Chemiphar	Japan (2005)	Marketing of Vogseal for diabetes
Be Tabs pharma	South Africa (2006)	Generic company
Glaxo smithkline	Spain and Italy (2006)	Acquires generics business
Terapia	Romania (2006)	Generic company
Inward		
Eli Lilly	USA(2001)	Clinical trials and market products in India
Zenotech	USA(2006)	Market oncology products globally
Domestic		
Orchid Chemicals	Marketing (2008)	API and dosage forms
Glaxo smithkline	R&D (2003 and 2007)	Chemistry >>leads >> clinical proof
IPCA	Manufacturing (2007)	Anti diabetic medications
Cipla	Marketing (2001)	NDDS - Cifran and Zanocin
Zydus Cadila	Marketing (2001)	NDDS - Cifran and Zanocin
MAJORITY PARTNER		
Daiichi Sankyo (2009)	combine innovation and generic competency	

Source : www.ranbaxy.com

In 1995, Ranbaxy acquired Ohm Laboratories (North Brunswick, New Jersey, USA) which provided it with an entry into the US OTC market. It also gave Ranbaxy the access to USA-FDA approved manufacturing. This acquisition also helped Ranbaxy file and receive approvals for a number of ANDAs, by reducing timelines, which has helped Ranbaxy develop, file and manufacture more than 99 product filings. Access to the European market was through the acquisition of Basics in Germany, Bayer's generics business. This acquisition allowed Ranbaxy access to Europe's generic market as well as provided a channel for the introduction of new products in its portfolio.

In 2005, Ranbaxy entered into a JV with Nippon Chemiphar, a midsized drug company and gained access into the Japanese generics market. The objective was to launch the anti-diabetic drug Voglibose in the Japanese market. This JV was dissolved in 2009 when Ranbaxy was acquired by Daiichi Sankyo.

In 2001, Eli Lilly a US based company with focus on oncology, entered into alliance with Ranbaxy with the long term objective of undertaking clinical trials for their products in oncology, diabetes, cardiovascular and internal medicine. In 2006 Ranbaxy entered into an alliance with Zenotech Laboratories Ltd, a Specialty Generic Injectables company with strong expertise in the area of Bio-technology. This enables Ranbaxy to enter into the niche therapy areas like Oncology and Anesthesiology. Zenotech has Research and Development facilities in India and in the U.S.

In 2008 , Ranbaxy entered into a strategic alliance with Chennai based Orchids chemicals and pharmaceuticals for the dosage formulations and API business. Collaboration for New Drug Discovery Research between Ranbaxy and GSK was initiated in 2003, which was again expanded in 2007. The agreement between the two companies was to collaborate on two research programs: chronic obstructive pulmonary disease and anti- infectives.

Cipla : An Indian pharmaceutical company, renowned for the manufacture of low cost anti AIDS drugs, was founded by Dr. K. A. Hamied in 1935. Before 1984 the company was known as The Chemical Industrial and Pharmaceutical Laboratories Ltd. Cipla's product range cover antiretroviral, antibiotics, anti-bacterial, anti-asthmatics, anthelminthetics, anti-ulcerates, oncology, corticosteroids, nutritional supplements, face wash, contraceptive pills, weight loss, and cardiovascular drugs. Cipla exports raw materials, intermediates, prescription drugs, OTC products and veterinary products to the tune of INR 17,800 million. The company offers technology for products and processes, and services like quality control, engineering, project appraisal, plant supply, consulting, commissioning and know-how transfer, support.

Table No. 4 : Cipla Alliances

Company	Country	Objective
Outward		
Neolab	U.K. (1999)	Generic products manufacturing
Medpro	South Africa(1992)	Manufacturing
Genopharma	Australia(2001)	OTC range manufacturing
Novopharm	Canada	Anti asthmatic products manufacturing
Channel	Ireland	All products
Zenith & Goldman	US	Anticancer
Pentech Pharma	US(2004)	Generic products
Ivax	US(2004)	Generic products
Eon	US(2004)	Generic products
Morton grove	US(2004)	Generic products
Chanelle	Ireland (1998)	green field manufacturing facility
Teva	Israel (2005)	Generic products
Akorn	US	Generic products
Heliopharm	Egypt	Generic products
Aotuokang Pharmaceutical	China	Generic products
Inward		
Watson pharma	US (2002)	develop 26 generic products
Pfizer	US (2009)	Generic products
Avestha Gengraine	France	collaborative biopharmaceutical development
Domestic		
Ranbaxy	Co-marketing	Carvedol (cardiovascular), Atorvastatin (cholesterol reducer), Cefpodoxime (antibiotic) and Venlafaxine (anti-depressant)
Stempeutics	Research & marketing (2010)	Stem cell therapy
Source : www.cipla.com		

Cipla has entered into alliances with reputed international companies for marketing its products. The company as a strategy has not established overseas offices but has entered into marketing alliances. In 2001, Cipla tied up with US based Zenith Goldline and United Research Labs for marketing Flutamide an oncology drug in the US and European markets. It's alliance with Neolab, UK and Chanelle Pharma, Ireland enabled it to market generic products in the European markets. In 2004, Cipla allied with Pentech, Ivax, Eon and Morton grove, generic pharmaceutical companies in the US for a range of products. The alliance partners have enabled Cipla to file more than 66 ANDAs in two years. Cipla has entered into alliances with global generic giants like Teva (Israel), Watson Pharma (US) for the supply of bulk drugs

to these global firms. In 1999, Cipla and Ranbaxy entered into a strategic partnership to jointly market a select basket of drugs in the cardiovascular and perennial anti- infective market. In 2010 Bangalore based Stempeutics has entered into strategic alliance with Cipla for marketing its products. Under this alliance, Cipla is sponsoring upto Rs. 50 crores in Stempeutics in the initial phase for research and development of stem cell based products.

Dr. Reddy's Laboratories:

Table No. 5: Dr. Reddy's Laboratories – Alliances

Company	Country	Objective
Outward		
	Russia (1995)	Joint venture
NovoNordisk	1997	Licensed antidiabetic molecule
NovoNordisk	1998	Licensed DRF2725(Ragaglitazar)
Novartis	2001	DRF 4158 out licensed
BMS laboratories	UK (2002)	Manufacturing
Meridian Healthcare	UK (2002)	Manufacturing
Trigeneis		Access to drug delivery technology platforms
Roche	Mexico (2005)	API business
Rheoscience	2005	Co development and commercialization (DRF 2593)
Merck	US (2006)	Generic partner for Proscar and Zocor brands
Betapharm	Germany (2006)	Generic facility
BASF	US (2008)	Manufacturing
Dow Pharma	UK (2008)	Small molecule business
Inward		
GS K	Marketing in emerging markets (2009)	Manufacturing & marketing of branded drugs
Domestic		
Benzex Labs pvt	Bulk actives business	
American Remedies		Acquired to consolidate manufacturing
Cheminor Drugs	Merger	
Aurigene (Indian Subsidiary)	Merger	Reorganise Drug discovery
Source :www.drreddys.com		

Dr. Reddy's Laboratories manufactures and markets a wide range of pharmaceuticals both in India and abroad. The company has 60 active pharmaceutical ingredients to manufacture drugs, critical care products, diagnostic kits and biotechnology products. The company has 6 FDA plants that produce active pharma ingredients and 7 FDA inspected and ISO 9001 and ISO 14001 certified plants. Dr. Reddy's Q1 FY10 result shows the revenues of the company at Rs. 18,189 million which is up by 21%. During this quarter the company introduced 24 new generic products, applied for 22 new generic product registrations and filed 4 DMFs.

DRL entered the global market by first exporting drugs to Europe and Far East in 1990, set up a JV in Russia. In 1998, it licenses the anti diabetic molecule Ragaglitazar (DRF- 2725) to NovoNordisk. In 2002, it acquires BMS laboratories and Meridian Healthcare in the UK. In 2005 it acquired Roche's API business and state of art, manufacturing site in Mexico. In 2006, it acquires Betapharm the fourth largest generics company in Germany. In 2008, it acquired BASF's Pharmaceutical manufacturing facility at Louisiana.

In 2009, GSK had announced an agreement with DRL to develop and market as select group of products in the emerging markets excluding India. It merged the Drug Discovery Operations into Aurigene, a wholly owned subsidiary of Dr. Reddy's.

Lupin :

Table No. 6: Lupin – Alliances

Lupin – Alliances		
Outward		
Company	**Country**	**Products**
Kyowa Pharmaceuticals	Japan(2007)	Generics
Hormosan	Germany(2008)	Generics – CNS(Acquisition)
Pharma Dynamics	South Africa(2008)	Generics- CVS (Acquisition)
Generic Health	Australia (2008)	
Forest Labs	USA(2008)	Marketing branded products
Multicare Pharmaceuticals	Philippines (2009)	Branded Generics (Acquisition)
Domestic		
Rubamin Laboratories	manufacturing	

Source: www.lupinworld.com

Lupin Ltd. has a strong research base in Generics, New Chemical Entity, Novel Drug Delivery Systems and research. It's global footprint include USA, Japan, Australia, UK, Germany. In 2008, Lupin entered a multiyear promotion and marketing agreement for the AeroChamberPlus line of products with Forest Laboratories.

Sun Pharmaceuticals: Sun Pharmaceuticals was started in 1983, with 5 products and today has emerged as one of the leading pharmaceutical companies in India. They are involved in making specialty API and pharmaceuticals for India, US and the world markets. Through a series of acquisitions, Sun Pharma has achieved the organic growth it desired. The acquisition of Caraco, a US based generic manufacturer in 1997, gave access to a US FDA approved manufacturing facility thereby aiding the process of bringing new drugs into the US market.

Table No 7: Sun Pharma – Alliances

Sun Pharma – Alliances		
Outward		
Company	**Country**	**Products**
Caraco Pharma (1997- 2004)	US	generic and branded
ICN- Alkaloida	Hungary (2005)	bulk activities
Bryan , ohio	US	Manufacturing Plant
Able Labs	US	intellectual property
Taro Pharmaceuticals	US, Israel , Cananda (2007)	Multinational generic manufacturer
Chattem Chemicals	Tennesse, USA(2008)	Narcotic raw material importer and manufacturer of controlled substances
Domestic		
Phlox Pharma	Merged 2004	API manufacturing - cephalosporins
Pradeep Drug Company	Acquisition 2000	API manufacturing site
Milmet labs	Acquisition 1999	Opthalmology brands
MJ Pharmaceuticals	Equity 1996	Manufacturing capability
Gujarat Lyka Organics	Equity1996	Cephalexin
TDPL	extensive products (1997)	Oncology, fertility, pain management
Source: www.sunpharma.com		

The acquisition of Taro Pharma allowed access to countries like US, Israel and Canada. Taro has more than 100 ANDA approvals in US and has a strong franchise in dermatology, cardiovascular, neuropsychiatry and anti-inflammatory therapeutic categories. In 2008 Sun

acquired Chattem Ltd. a narcotic raw material importer and manufacturer of controlled substances.

1.5 Need for Research

McKinsey report indicates that with the current economic growth pattern, the Indian pharmaceutical market will triple to US$ 20billion by 2015 which is attributed to six trends: Doubling of disposable incomes of middle class; Expansion of medical infrastructure; Popularity of health insurance; Chronic diseases; Adoption of product patents; and Aggressive market penetration by smaller companies. According to *IMAP healthcare report (2011),* although there has been a reduction in the number of mergers in the pharmaceutical sector in 2011 in comparison to 2009, global pharmaceuticals continue to look at emerging markets to secure future growth by acquiring and alliancing with various companies including generic ones.

Patent expiry and rising cost pressures will encourage the alliance formation of multinational companies with local players in the 17 emerging markets, India being the foremost among them. Growing regulatory pressures and introduction of risk evaluation and mitigations strategies, makes it increasingly difficult for the approval of new drugs, which would eventually lead to greater cooperation between pharmaceutical companies. Sustainability of a pharmaceutical company is dependent upon the continuity of its new drug pipelines, which is often achieved through acquisition of smaller research driven firms. Small research driven companies lack the capital for product launches and marketing, thus alliances are the directions taken by most companies. India is not far behind in alliance formation. Over the last decade the number of alliances has increased. Most alliances are successful as the objectives are met, many are not. Recently the alliance between Biocon and Pfizer was called off. There are many reasons why an alliance can fail. Since the alliance is an outcome of a business objective and involves considerable investment, it is critical that companies need to focus on making it successful. An understanding of the pharmaceutical environment in India and the alliances that have happened between Indian and foreign pharmaceutical companies over the last four decades can help companies in the future to realize their business objectives effectively through alliances and

collaborations. Some of the reasons that substantiate the necessity of a research on this subject are enumerated below:

- The alliances between Indian and foreign pharmaceutical companies have increased over the years.
- Alliances today involves multimillion dollars, with clear business objectives, hence understanding them can mitigate failures.
- Alliances have an impact on many aspects of the business including people, studying the factors that have influenced the alliances between Indian and foreign pharmaceutical firms can help develop a clear picture of alliance success factors.
- Very little research has been done on the subject of strategic alliances in the Indian pharmaceutical industry, its impact on business aspects considering the fact that it is the most important science based industry in India.
- An in depth research highlighting the areas of improvement may prompt increased regulations, which will enhance the scope for investments.

1.6 Objectives of the Research

A study on the strategic alliances between Indian and foreign pharmaceutical firms, tracks the Indian Pharmaceutial industry over the last 5 decades. It is aimed at understanding the various politico-legal, economic and technological aspects that have laid the foundation for the alliances in India. Studying the evolution of the pharmaceutical industry in India would throw light on the key players in the Indian pharmaceutical industry.

The specific objectives of this study are:

- *To analyze the business related factors responsible for the strategic alliances between Indian and foreign pharmaceutical companies in the period starting from 1970–2009.*

  The strategic alliances have been on the rise in the last two decades. Understanding the reasons for the same would throw light on the influencing factors of alliances.

- *To understand and analyze the implications of strategic alliances that benefit the pharmaceutical companies and the industry in general.*

  The strategic alliances that have happened between Indian and foreign pharmaceutical companies have had positive and negative implications. Understanding the implications would help future alliances, to maximize the positive aspects and mitigate the negative.

- *To evolve a model on pharmaceutical alliances, which would help Indian pharmaceutical companies augment the beneficial aspects of the alliance.* The outcome of the study will help realize the factors which can influence the future course of alliances in the country. Additionally factors which are critical for the success of alliances between Indian and foreign pharmaceutical companies can be correlated.

1.7 Benefits of the Research

The Indian pharmaceutical companies are entering into more and more alliances with foreign companies which will have an impact on various aspects of the organization like: people and their attitudes, processes being followed in the organizations and possibly the very existence of the organization. The research will help us identify the factors that encourage the formation of strategic alliances in the Indian pharmaceutical sector. By understanding the impact of the alliances on different business aspects, pharmaceutical companies can undertake alliances which are in line with their growth plans.

Understanding the hindrances for alliances, the companies can mitigate the risks involved in the alliances and ensure the alliances success by meeting the objectives of the alliance.

1.8 Research Framework

The research is focused on the Indian pharmaceutical industry and its alliances and would cover aspects of the reasons for the alliances and the implication of the alliance.

A focus group interview involving CEOs of Indian companies who were involved in strategic alliances with foreign pharmaceutical companies, was conducted to understand the alliances in the Indian pharmaceutical industries' context. This provided the necessary frame work for the study and helped to crystallize the objectives.

An extensive literature review was undertaken to understand the alliances over the years. The literature review helped to identify the various factors that influence the formation of strategic alliances as well the factors which prove to be hindrances. The various aspects of business which are impacted by strategic alliances are identified by the literature review. These helped in crystallizing the research objectives and develop the research instrument to undertake the primary research.

The primary research was conducted using a structured questionnaire and the respondents were selected from the Indian pharmaceutical industries who have undertaken strategic alliances with foreign pharmaceutical companies over the years, sourced from the OPPI database. The respondents were senior members of the organization who were able to respond to strategically relevant topic of alliances.

The data was tested for consistency and analyzed with the SPSS software. The variables are analyzed using statistical tools. Regression analyses helped in assessing the correlation between the variables and develop a predictive model.

CHAPTER 2: PHARMACEUTICAL INDUSTRY

2.1 Overview of the Global Pharmaceutical Industry

The pharmaceutical industry is the building block of the healthcare system. Research based pharmaceutical companies contribute to the global health through the development of innovative medicines. The IMS Institute for Healthcare Informatics predicts that the pharmaceutical market will reach nearly USD 1,200 billion by 2016, an increase of nearly USD 250 billion from the USD 956 billion recorded in 2011. This growth is due to the market expansion and generics*(IFPMA, 2012)*.

2.1.1 Early Period in the World Pharmaceutical Industry

The first known drug store was opened by Arabian Pharmacists in Baghdad in 754 CE, and was adopted into medieval Europe. The modern pharmaceutical industry has its origins in the coal tar industry that arose in German speaking lands in the mid-nineteenth century, and can be traced to two sources: apothecaries that moved into wholesale production of drugs such as morphine, quinine, and strychnine in the middle of the 19th century and dye and chemical companies that established research labs and discovered medical applications for their products starting in the 1880s. Merck, for example, began as a small apothecary shop in Darmstadt, Germany, in 1668, only beginning wholesale production of drugs in the 1840s. Likewise, Schering in Germany; Hoffmann-LaRoche in Switzerland; Burroughs Wellcome in England; Etienne Poulenc in France; and Abbott, Smith Kline, Parke-Davis, Eli Lilly, Squibb, and Upjohn in the U.S. all started as apothecaries and drug suppliers between the early 1830s and late 1890s. William Perkins, in the nineteenth century manufactured the first artificial dye, aniline purple which instigated German and Swiss companies to take up the manufacture of dyes seriously, thereby leading to the discovery of a number of chemical compounds which were therapeutically useful. Bayer in Germany developed Aspirin in 1899. In 1880, Burroughs Wellcome & Co. was established by two American trained pharmacists who introduced American style marketing and manufacturing methods, and created a research laboratory within the company, the first of its kind in the country. The discovery of penicillin in the 1920s heralded the era of mass production of drugs and can be considered as the harbinger of the development of global pharmaceutical companies.

2.1.2 The Pharmaceutical Golden Era: 1930-60

In 1942 Dr. Selman Waksman of Rutgers University discovered anti-tuberculosis agent streptomycin, thereby opening the flood gates for new products post World War II. The development of penicillin by 11 US Pharmaceutical companies, under the oversight of War Production Board, gave US firms a leading position after World War II. Antibiotics that were produced were streptomycin (Merck), chlortetracycline (Lederle), chloramphenicol (Parke-Davis), erythromycin (Abbott and Lilly) and tetracycline (Pfizer). Success in these ventures, led the pharmaceutical companies to invest in synthetic chemistry. Rapid advance in analytical techniques and instrumentation aided in determining molecular structure and aided in the transition of wet chemistry to dry chemistry involving minute samples and molecular models. In 1938 Food Drugs and Cosmetic Act was enacted in the US. Approval of any new drug required preclinical and clinical trials failing which no new launch was approved by the Federal Authorities. The USFDA promoted the double-blind, clinically controlled trials as the gold standard for testing new medicines on patients. The decisions regarding the suitability of the drug was dependent upon, the characterization of safety and effectiveness of the drug in large populations. Thus the therapeutic revolution in drugs stimulated two fundamental changes in the manufacturing firms, major companies were transformed from a full line commodity house to a vertically integrated research and information intensive "specialty" manufacturer by the late 1950s, where the products were protected by patents, promoted by brand names and purchased only with a doctor's prescription. The second change was that nationally based companies became transnationally organized, thus sales, production, research and marketing were carried out in different countries. By 1950s, corticosteroids, oral contraceptives, antihistamines, antidepressants, diuretics, semi synthetic penicillin and many more drugs were discovered and patented, thereby transforming the pharmaceutical industry from a commodity business to a highly research intensive, marketing oriented , business *(Taggart, 1993)*.

2.2 Characteristics of the World Pharmaceutical Industry

The pharmaceutical industry is characterized by: High costs of drug discovery, patents and globalization in the recent times. The industry has large number of small companies and a small

number of large companies. The big pharmaceutical companies are concentrated in the highly industrialized, Organization for Economic Co-operation & Development (OECD) countries.

2.2.1 Patents

The patent protection for pharmaceutical industry is critical as the actual manufacturing process is easy to replicate and can be copied with very little investment. The TRIPS Agreement in 1994, allowed the developing countries to be brought under the blanket of patent protection. Countries that have joined the WTO have obliged to accept the protection whereas the least developed countries are not required to meet this obligation until 2016.

The World Trade Organization was established in 1994 in Marrakech after the Uruguay Round of Trade Negotiations. The predecessor to the WTO was the General Agreement on Tariffs and Trade (GATT). The Uruguay Round brought in the Agreement on Trade Related Aspects of Intellectual Property Rights, known as TRIPS. The objective of the TRIPS was to create an equitable system of international trade, wherein developed countries reduce import barriers and developing countries open the market for high value exports from developed nations. A unique aspect of the pharmaceutical industry is that the invention or the new molecule needs to be disclosed well before the product is brought to the market, to enable trials and share the information with the group. This leads to considerably short periods of patent exclusivity for the firm planning to launch the new product, thereby eroding its profits. According to UNCTC, the patent protection is of four types in the pharmaceutical industry:

- Patents on the composition of matter
- Patents granted for a specific product
- Process patents relating to the production process rather than the finished products
- Application or usage patents

2.2.2 Globalization

The International Monetary Fund (IMF), defines globalization as the growing economic interdependence of countries through increasing cross- border transactions in goods & services,

free flow of international capital, and rapid and widespread diffusion of technology. *Narula & Dunning (1998)* observed that globalization, alliance capitalism and R&D-intensive value adding activities are hallmarks of economic activity in advanced industrial countries. According to them globalization is an increasing interdependence and convergence in consumption patterns and technologies across countries, internationalization of production through networks, overlapping and merging of industrial sectors, increasing capital and knowledge intensity as well as a concurrent shortening of technology life cycles. They have observed an increase in alliances across all of the advanced industrialized economies and the nature of the alliances are strategic and alliances are no longer simply undertaken as a means of avoiding transaction and coordination costs of markets. One of the original motives for alliance formation was to acquire market access and/or overcome supply bottlenecks, i.e., to achieve vertical integration where such integration was not possible through hierarchies. They indicate that inter-firm alliances are increasingly being undertaken, through various modes, as a direct response to pressures brought about by contemporary technological developments and globalisation.

Kesic (2008), has identified some factors that are responsible for pharmaceutical globalization in the last decade. They include: Lack of new products in the pipeline, need for huge investment in R&D & marketing, increased competitiveness, world reforms in healthcare, and increased focus on regulations. The success of the molecule would depend on the marketing and sales activities. Therefore the success of a pharmaceutical company largely depends upon, strong research and development combined with a compelling marketing and sales related activities. The large pharmaceutical companies invest on an average, 16% of their sales turn over into R&D, and 26% into marketing and sales related activities *(Kesic, 2006).*Originators invest heavily on R&D and produce new and inventive products which earn maximum profits during the patent period. The generics are engaged in producing cheap drugs by imitating the original one, thus their strategy is oriented towards producing products that are considerably less priced.

2.2.3 Drug Development Process and Medical Research

The actual drug manufacturing is the consequence of a complex and lengthy set of activities whose objective is new drug discovery. Every ethical drug manufacturing company is

constantly on the lookout for new molecules that would sustain the profitability when patented. A new molecular entity is discovered, developed and marketed through the process called as Drug Discovery. The new molecular entities discovered may be original or may be the outcome of minor molecular modifications of existing drugs. Drug Discovery process involves screening millions of chemical compounds with therapeutic properties. The objective is to find potential molecules which can alleviate or prevent disease conditions (*Ratti and Trist, 2001*).

The process of developing a molecule for therapeutic applications involves a number of complex steps including clearance from regulatory authorities. The phases are :

(i) Target selection, wherein a promising compound with therapeutic efficacy is selected from a myriad of chemical entities

(ii) Preclinical phase involves the necessary testing on animals before it is tried on humans. The toxicity of the drug is evaluated in this phase

(iii) Clinical phase:

- Phase I - the compound is studied for the first time in healthy human volunteers
- Phase II - proof of concept and evidence of efficacy and safety in patients
- Phase III - the studies are conducted on a large population to generate data on safety and efficacy of the drug. The therapeutic product is then filed for license for marketing purpose
- Phase IV- post marketing studies

DiMasi and Grabowski (2003), have estimated the research and development costs of 68 randomly selected new drugs of 10 pharmaceutical companies and arrived at a figure of USD $403million. They indicate that the expenditures on pharmaceuticals have grown since the late h1990s, which was attributed to the lengthy and costly process of new drug development. They have described that an overall clinical approval success rate is the probability that a compound that enters the clinical testing pipeline will eventually be approved for marketing and attrition rates describe the rate at which investigational drugs fall out of testing in the various clinical phases. R&D costs for new drugs (including the costs of failures and time costs) have been estimated to average in excess of $800 million (in year 2000 dollars) for development that led

to approvals in the 1990s, with a marked upward trend relative to earlier decades (*DiMasi et al., 2003*).

2.3 Leading Pharmaceutical Companies of the World

According to *Kesic (2006)*, the leading ten world pharmaceutical companies command more than 42% of the market share of the global pharmaceutical market. The global pharmaceutical companies can be categorized as Originators and Generic firms. Originators include those companies who invest substantial amounts on R&D and bring out new block buster molecules. The generics include those firms that produce equivalents of the original block buster molecules. These manufacturing giant are able to achieve cost actualization with massive scale ups.

TableNo.8: Leading World Pharmaceutical Companies in 2010(Originators)

Rank	Company name	Country	Sales ($Billion)	R&D investment (Million)
1	Johnson & Johnson	USA	6190	6986
2	Pfizer	USA	5001	7845
3	Roche	Switzerland	4735	9874
4	GlaxoSmithkline	UK	4583	6335
5	Novartis	Switzerland	4427	7469
6	Sanofi	France	4199	5729
7	AstraZeneca	UK	3281	4409
8	Abbott Laboratories	USA	3076	2744
9	Merck &Co	USA	2743	5800
10	Bayer Healthcare	Germany	2230	2306

Source *- IDFC – SSKI Research, Changing Landscapes – a special report on the World's Top 50 Pharma Companies, www.pharmexec.com,may 2006*

Table No 9 : Leading World Pharmaceutical Companies in 2010 (Generics)

Rank	Company name	Country	Sales ($Million)	World market share (%)
1	Teva Pharmaceutical	Israel	6.956	21.8
2	Mylan	USA	3.620	11.3
3	Sandoz	Germany	2.494	7.8
4	Watson Pharmaceuticals	USA	2.000	6.3
5	Greenstone	USA	1.700	5.4
6	Par Pharma	USA	1319	4.1
7	Hospira	USA	1061	3.3
8	Apotex	Canada	879	2.3
9	Mallinckrodt	USA	860	2.7
10	Dr. Reddy's	Inda	834	2.6

Source *- IDFC – SSKI Research, Changing Landscapes – a special report on the World's Top 50 Pharma Companies, www.pharmexec.com,may 2006*

Increased competitiveness is pushing the pharmaceutical companies towards consolidation which leads to the formation of bigger pharmaceutical concerns across the globe. It is also evident that innovator companies invest substantial amounts of their profits into R&D.

2.4 Indian Pharmaceutical Scenario

Traditionally two systems of medicine were in vogue in India, the Ayurvedic and the Arabian medicine systems. The ayurvedic medicine uses a combination of herbs and minerals and has references in the ancient texts like Vedas. The Arabian medicinal systems are the outcome of innumerable invasions from the Arabic world. With the advent of the British rule, the western medicinal system, namely the Allopathic medicinal system was introduced into India. With the educational system, including the medical education being modeled on the British system, allopathic and modern medicine started taking roots in India and has evolved to be widely accepted over the last 250 years.

The exact date on which the Allopathic medicine entered India is not really documented, however it is assumed to be during the early part of the 19^{th} century. Medicines imported by the British for their personal use marked the beginning of the usage of allopathic medicines in India. In 1901, the Bengal Chemical and Pharmaceutical Works was started with the objective of starting indigenous production of medicines in India. The company started with the production of Tetanus antitoxin, in 1930.Two MNCs namely ParkeDavis(1907)and Burroughs Welcome(1912), commenced trading operations for formulations. Indigenous production was sufficient to meet only13 percent of the demand, thus a large portion of the domestic demand was still being supported through imports mainly from Germany and United Kingdom. Between 1904 and 1907 four research institutes were commissioned: Haffkine Institute, King Institute, Pasteur Institute and Central Research Institute. The domestic production of medicine received an impetus due to the steep demand during the First World War. Production of caffeine and quinine salts registered substantial growth, till the end of the war (*Bhojwani, 2005).*

By 1941, the Indian pharmaceutical industry took up the manufacture of new drugs like iodochloro-hydroxyl-quinolone as well as a number of alkaloids like ephedrine and codeine. Chemotherapeutic drugs, anti-leprotics, glandular extracts – liver extracts, colloidal solutions of

- Calcium, Manganese, Silver and Iodine were being produced by the Indian Pharmaceutical industry during this period. By the end of the First World War, four global pharmaceutical majors- Glaxo, Boots, May&Baker, CibaGeigy had established their presence in India *(Bhojwani, 2005)*.

Post the war a large number of pharmaceutical products entered obsolescence, thereby older antibiotics and chemotherapeutic agents were replaced by newer ones. This was indeed a set back to the Indian industry. They started the manufacture of formulations based on imported bulk drugs and the extraction of therapeutic agents from plant sources.

2.4.1 Evolution of the Indian Pharmaceutical Industry

Five decades ago, the pharmaceutical industry in India was at a rudimentary stage, with a high dependence on imported medicines from abroad. Manufacturing facilities in India were almost non existent due to the lack of manufacturing facilities as well as the archaic laws that were being followed post Indian independence. Medicines were priced very high and were beyond the reach of the common Indian.

Post independence the Government embarked upon planned expansion of Indian industry including the pharmaceutical industry. In 1947, the estimated value of production of pharmaceuticals was Rs.10crores, which rose to a whopping Rs.26540crores in 2002-03. The evolution of this industry is the result of number reasons. The new Indian government in 1947, emphasized on industrialization invested in pharmaceuticals among other industries. The government did not discourage foreign firms from competing in India, as there were no local substitutes for MNCs technology. The first concrete step taken towards self reliance in pharmaceuticals was the establishment of Hindustan Antibiotics Ltd (HAL) in 1954 and Indian Drugs and Pharmaceuticals Ltd (IDPL) in 1961. The IDPL played an important role in developing technical know-how to develop antibiotics and move towards self reliance. It was a soviet sponsored program which showed that it was possible to produce drugs in India, it helped develop human and physical capital and spurred the mushrooming of support institutes like pharmacy colleges and other business elements upstream and downstream(*Sean Eric Smith, 2000)*.

The colonial patent law of 1911 secured the Indian market to British industry. A large majority of drugs were imported from abroad until the Patents Act 1970 brought a turnaround. The major growth of the Indian pharmaceutical industry can be attributed to the enactment of the Indian patents Act 1970, which came into force in 1972 and was a part of a wider a set of policies of the government of India to develop 'self reliant' pharmaceutical industry. This Act provided for product patents for all inventions except for food, medicine, drugs and substances produced by chemical process. For the latter category only the process patent was accorded. The patent term was also reduced from 16years to 5 years from the date of patent approval or 7 years from the date of application whichever is earlier. Consequently, Indian companies evolved to reverse engineer and copy the major drug and produce them at minimal costs. Although this act was ethically unacceptable to foreign MNCs, it provided the opportunity to develop India's pharmaceutical industry throughout the 70s and 80s. The provision of compulsory licensing which provided for the opening of the patented drug for the generic replication by others if the drug was found to be unnecessarily high priced was made after three years from the date of approval of the patent (*Nauriyal D K, 2006*).

From 1970, local Indian firms reverse engineered bulk drugs, which they sold wholesale or processed into simple formulations, which further discouraged the MNCs to expose their IP. Thus by 1997, MNCs accounted for 30 percent of bulks and 20 percent of locally produced formulations. By 1970, the number of drug manufacturing units grew from 2257(in 1970), to 5156(in 1980) to 16,000(in 1990) and to over 23000(in 2005) with 349 units in the formal sector. In the 1980s the industry had grown at a rapid rate of 11 percent per annum. The average growth of the industry in the last few years has been about 12% compared with the growth of the fast moving consumer goods sector, which has grown approximately at 4.7% (*Greene William, 2007).*

The industry was producing only formulations in the pre-1970s, and started manufacturing more than 400 bulk drugs amounting to 6% of the international bulk drug market. More than 85% of the formulations produced in the market are sold in the domestic market. The essential drugs comprising antibiotics, antibacterial, antiparasitic and cardiovascular constitute a major portion of turnover of the industry.

The evolution of Indian pharmaceutical industry can be tracked over four stages:

The **first stage** 1950s and 60s witnessed a huge dependency on foreign multinationals to provide essential medicine to the Indian population. The domestic manufacturers were engaged in repacking the formulations produced by multinationals (*Lalitha, 2002*).Since the Patents Act of 1911was in vogue, the indigenous firms were legally prevented from manufacturing any drugs introduced in the country. The domestic firms, as per the laws prevailing at that time were also forbidden from processing a patented drug into formulations or importing it.

The **second stage** of the industry took place in the 1970s with the enactment of the Indian Patent Act (IPA) 1970 and the New Drug Policy (NDP) 1978. This is a significant phase as this was the foundation for the development of the pharmaceutical industry in India. Critical aspect of this Act was reducing the scope of patenting to only process and not the product, for a short period of seven years, from the initial period of 16 years. The 1970 Patent Act provides protection for the processes of manufacturing drugs for 7 years from the date of filing the application, or 5 years from the date of grant of the patent. Under this Act, only one process that was used to manufacture the drug could be patented. The NDP 1978 increased the pressure on the foreign firms to manufacture bulk drugs locally from the basic stage. This period led to the birth of "Reverse Engineering" in India. Pharmaceutical units started producing essential drugs and drugs that were imported till then. By 1972, over 100 essential drugs covering a wide spectrum of therapeutic groups like antibiotics, sulpha drugs, anti leprotic drugs, analgesics, antipyretics, vitamins, tranquillisers, photochemical and various other pharmaceutical chemicals were produced in India from basic stages (*Narayana, 1983:42).*

This period also witnessed the introduction of two significant Acts: The Monopolies and Restrictive Trade Practices Act (MRTP) and the Foreign Exchange Regulation Act (FERA). These two Acts were aimed at reducing the concentration of economic power in the hands of a few units and controlling the flight of the foreign exchange from the country (*Lalitha,, 2002).*

In **the third stage** of its evolution, domestic enterprises based on large scale reverse engineering and process innovation achieved near self sufficiency in the technology and production of bulk drugs belonging to several major therapeutic groups and have developed

modern manufacturing facilities for all dosage forms like tablets, capsules, liquids, orals and injectibles and so on.

The fourth stage in the 1990s witnessed dramatic changes in the policy regime governing the pharmaceutical industry. The licensing requirement for drugs was abolished, 100 per cent foreign investment was permitted under automatic route, and the scope of price control had been significantly reduced. All those drugs which were limited to the public sector were de-licensed, thus leading to an increase in drug production. This also enhanced the competition between domestic and foreign firms in the 1990s. The Government of India signed the TRIPS Agreement in1994. Thus, started a new chapter in the history of Indian pharmaceutical sector where free imports, foreign investment and technological superiority would determine the trade patterns and industrial performance.

The Indian pharmaceuticals industry has grown from a mere US$ 0.32 billion turnover in 1980 to approximately US$ 21.26 billion in 2009-10.The country now ranks 3rd in terms of volume of production (10% of global share) and 14th largest by value *(Indian business.nic.in/industry).* The Indian Pharmaceutical Industry currently represents US$ 6 billion of the $550 billion global pharmaceutical industry (*KPMG 2007*). It represents 8 percent of the global industry by volume and 13 percent by value, thereby taking the fourth place worldwide.

The Indian pharmaceutical industry can be divided into two sectors, the organized sector consisting of 250-300 companies and the unorganized sector with an estimated 20,000 firms. An expert committee set up by the government of India has clarified the number of active units on the basis of drug manufacturing licenses issued to 5877(*Sampath 2005).* Primary associations which represents most of India's pharmaceutical companies: the Organization of Pharmaceutical Producers of India (OPPI), the Indian Pharmaceutical Alliance (IPA) and the Indian Drug Manufacturers' Association (IDMA).

According to the OPPI, India has a strong well established manufacturing base and a large number of well educated, English speaking workforce which contributes to the positioning of India as a likely hub to meet the current worldwide demands for reduced manufacturing costs, trained personnel and reduced R&D costs. 700,000 scientists and engineers graduate every year,

including 122,000 chemists and chemical engineers with 1500 PhDs, thus providing a high intellectual capital per dollar worldwide.

2.4.2 The TRIPS Agreement

The Indian Government post independence was deliberating on the patent law, with the ultimate objective of reviving the domestic pharmaceutical industry. In 1972, after repeated expert reports and deliberations in Parliament, the India Patents Act of 1970 came into force (*Mueller 2007, 22-25*).The 1970 Act with the intent to encourage indigenous technological skills and inventions imposed substantial limits on the patent rights of the western world (*Katherine et al, 2003).* Critical aspects were :

a) Lack of patent protection for pharmaceutical products.

b) Firms were permitted to patent only a single process for making a pharmaceutical product, a firm could not block competitors by patenting all possible processes for making a drug.

c) The term for pharmaceutical process patents shortened to five years from the grant of the patent or seven years from application filing, whichever was less, compared to 14 years from application filing for all other inventions.

d) The Act imposed very broad "compulsory licensing" provisions for pharmaceutical process patents.

This legislation weakened the intellectual property protection in India thus making pharmaceutical products unpatentable, thereby allowing inventions patented elsewhere to be freely copied and marketed in India (*Lanjouw, 1997*). The reducing of the statutory term on pharmaceutical process patents opened the floodgates for the domestic players to reverse engineer and introduce cheaper generics into the Indian market. The number of patents granted per year fell by three-quarters over the following decade, from 3,923 in 1970-71 (of which 629 were to Indian applicants, 3,294 to foreign applicants) down to 1,019 in 1980-81 (349 Indian, 670 foreign), *(Lanjouw 1997).*

In the Uruguay round of negotiations, India opposed the TRIPS mandate on pharmaceutical product patents. One of the implications of India joining the WTO is the requirement to comply with all the provisions of the Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPs). The Government of India introduced the Patents (Amendment) Ordinance on 8 January 1999 to meet part of the obligations under TRIPs.

2.4.3 Major Players in the Indian Pharmaceutical Industry

Many Indian companies have become global players, thanks to the convergent strategy adopted by them(*Bower & Sulej,2007*), which involves three steps: Develop generic drug manufacturing competency through reverse engineering, obtain approvals and market the generic products in regulated countries like USA and Europe and finally develop in house drug discovery capabilities to produce new bio-molecules. Indian companies have already established their credibility in the first two aspects and now are concentrating their efforts towards R&D and Drug development. Dr Reddy's, Ranbaxy and Cipla have achieved considerable success in this regard. Some of the major players in the Indian pharmaceutical industry are in the table below.

Table No. 10: Indian Pharmaceutical Industry – Major Players

Rank	Company	Revenue (2011) $Mio	Employees	Founded	Infrastructure
1	Cipla	1348.5	16000	1935	Indore, Sikkim, Baddi, Goa, Mumbai, Bangalore, Patalganga, Kurkumbh
2	Ranbaxy	1327.56	14000	1961	Dewas, Mohali, Paonta Sahib, New Delhi, Goa
3	Dr. Reddy's Lab	1178	14900	1984	6 FDA approved plants in India. FDA approved plants in Mexico, UK, USA
4	Lupin	929.8		1968	Mandideep, Tarapur, Goa.
5	Aurobindo Pharma	865.19		1986	Hyderabad

Source *- IDFC – SSKI Research, Changing Landscapes – a special report on the World's Top 50 Pharma Companies, www.pharmexec.com,may 2006*

2.4.4 Regulation in the Indian Pharmaceutical Industry

In India, the import, manufacture, distribution and sale of drugs and cosmetics are regulated by the Drugs *and Cosmetics Act, 1940* (DCA), the *Drugs and Cosmetics Rules, 1945* (DCR).

Drug (Prices Control) Order, 1995, Drugs (Magic Remedies) Objectionable Advertisement Act, 1954 and Pharmacy Act, 1948 are other regulations which have a bearing on the pharmaceutical business in India. The classification of the drugs in India is as: OTC drugs and Prescription drugs.

Over the Counter Medicines (OTC): 'OTC Drugs' means drugs legally allowed to be sold 'Over The Counter' by pharmacists, i.e., without the prescription of a Registered Medical Practitioner. The current market for OTC medicines in India is about $940million and is growing at 20 percent a year, which is double the rate for prescription medicines.

Prescription Drugs: Prescription drugs are those medicines that are listed in the Schedule H and X of the Drugs and Cosmetics Rule. Drugs listed in Schedule G do not need prescription to purchase but require a warning stating, "Caution: It is dangerous to take this preparation except under medical supervision". Drugs in the above three schedules are not advertised directly to the public under a voluntary commitment by the Pharmaceutical industry (OPPI,2009).

Marketing of Drugs in India:

The Ministry of Health and Family Welfare, Central Government is the responsible body for all legislations and regulating the pharmaceutical business in India. The state government through its Food and Drug Administration (FDA) enforces the Directives of the Ministry of Health.

The office of the Drugs Controller General of India (DCGI) has the primary responsibility of approving new drugs, molecules and standards, vaccines and sera, new usage and claims, new method of administration, clinical research and trials, introductions of new unique formulations and granting import and export licenses.

The Drugs and Magic Remedies (Objectionable Advertisement) Act and Rule lists out the ailments for which advertising is not permitted in India A voluntary code on OTC Advertising is being followed by all OPPI member companies. Additionally based on the DCGI code the Advertising Standards Council of India (ASCI) has brought out a code of advertising for pharmaceutical products.

Distribution:

Distribution in India is a challenge due to its huge geographical proportion. The drugs may be manufactured in any part of the country; however for it to reach the retail pharmacy a distribution system is essential. The manufacturer transports the drugs to depots for stocking before the sale is made. The depots can be company run depots or outsourced to Clearing and Forwarding (C&F) agents on behalf of the company. The C&F agent is supervised by the company directly. The C&F raises invoice to stockists or distributors who have stocking points in a particular area/ town. The stockist is responsible for the sale of goods to a retailer or wholesaler.

Price Control in Indian Drug Market:

The Drugs Price Control Order (DPCO) exercises price control on certain drugs in India. It takes the base from the Essential commodities Act (ECA). It is the responsibility of The Ministry of Chemicals and Fertilizers, and is under the supervision of the National Pharmaceutical Pricing Authority (NPPA). As per the DPCO1975, 347 drugs were under the price controlled category, which was brought down to 143 as per DPCO 1987. This number has been further brought down to 74 as per the DPCO-1995. In1995, the DPCO introduces three criteria to assess whether a particular drug should fall in the price control market: turnover, monopoly and competition. The government will continue to fix prices of those drugs whose annual turnover exceeds` 44 million. A drug is said to enjoy monopoly when the retail sales fall in the 10million to 40 million bracket and a single manufacturer has a market share of 90% and more. Ayurvedic medicines enjoy no price control.

Pricing:

The margins for the stockists and retailers are fixed by an agreement of Industry Associations and the All India Organization of Chemists and Druggists (AIOCD). The margin for the stockist/ wholesaler is fixed at 10% on the Maximum Retail Price and 20% for Retailers. For drugs which fall under the price controlled category the margins for the retailer is mandated at 16% as per the DPCO. The stockists retain 5-6% margin and pass on 3-4% margin to the sub wholesaler or bulk retail buyer.

2.4.5 Indian Pharmaceutical Industry Post 1995 – a Transition

Rapid growth in the Indian pharmaceutical sector is attributable to three critical changes (*Rai, 2008),* setting up of public sector enterprises to boost the pharmaceutical production of drugs and increase Indian competency in pharmaceutical production, second The Drug Price Control Order (DPCO) and third The Indian Patents Act of 1970, which opened the flood gates for generics in India. There was a spurt in activities around the drug production, including support areas like pharmacy colleges and downstream businesses.

One of the important strategies adopted by the Indian pharmaceutical industry post liberalization was active internationalization *(Chittoor et al. 2008).* This includes external internationalization like overseas acquisitions and inward internationalization like import of technology, raw materials, capital goods and trained manpower.

Sampath (2005) indicated that, the Indian pharmaceutical sector consisted of more than 20,000 manufacturing units of which 5877 firms were actively involved in the production of bulk drugs and formulations. 300 companies account for over 95% of the total domestic market and the rest are small players. Based on the sales turnover the 300 firms can be categorized under 3 broad groups as indicated in the table below.

Table 11 : Groupwise Representation of the Indian Pharmaceutical Industry

Firm	Formulations firms	No. of API Production (No. of firms)
Group 1	25	100
Group 2	275	200
Group 3	5700	5700
Total	6000	6000

Source : Sampath (2005), WHO- INTECH survey conducted in 2005

Group 1 comprises of large scale pharmaceutical firms that are subsidiaries of MNCs in India or wholly owned Indian firm. It includes firms like Ranbaxy, Cipla which spend considerable amount in R&D and are powered by the strategy to enter the global regulated market along

with semi regulated and domestic markets. Group 2 comprised of pure generic manufacturers who have limited competency on product development but are focused to cater to the needs of domestic and the semiregulated and unregulated markets. These firms are identified to have turnovers between Rupees 100-300crore. Group 3 includes companies which perform contract research and manufacturing (CRAM) for bigger Indian companies, both local and MNCs. These companies have an annual turnover of less than Rupees 100crore, whose strength is local network and connections. They do not have any R&D facilities and investments are made only towards upgradation of the manufacturing facilities.

Rai (2008) demonstrated that the dominant strategy of Group 1 firms are positive patenting, research on new chemical entity (NCE), innovation, biopharmaceutical research and developing New Drug Delivery Systems (NDDS). The Group 2 firms focus on non-infringing processes, innovations, positive patenting and specialty generics. Group 3 firms do not have any dominant competitive strategy.

Some of the criticisms that have been levied against the Indian pharmaceutical industry are: The focus on reverse engineering; Lack of expenditure on R&D; Inability to produce new drugs, which has resulted in an industry which is not invention based and aimed only at producing incremental modifications of existing drugs *(Sampath, 2005)*.

Today the Indian pharmaceutical industry is on the threshold of exploring new opportunities and scaling global heights. Although a large spectrum of the Indian pharmaceutical firms are active as generic manufacturers, many firms are focusing on R&D for innovations like novel drug delivery systems (NDDS), novel combinations, original R&D, thereby aiding the transition of the Indian Pharmaceutical Industry to modern times.

Historically, Indian firms have begun their foray into the pharmaceutical industry by mastering the process of reverse engineering and developing low cost drugs to meet the domestic needs in India. Basic research, development of chemical entity was completely omitted. Large firms were in a position to move towards NDDS which is research based.

Indian firms are building knowledge base and conducting incremental innovation through R&D and moving towards the generation of New Chemical Entities (NCEs), Indian

outsourcing industry for contract manufacturing and contract research (*Chaturvedi and Chataway,2006*). Additionally, many firms are outsourcing chemistry services to India primarily for organic synthesis and combinatorial chemistry to develop new chemical entities, which can be developed into new drugs. Indian contract manufacturing focuses on: contract manufacturing of patented drugs, specialized generics and old molecules (*Nauriyal, 2006).*

The biopharmaceutical sector is a promising area for Indian manufacturers with the focus being on the development of vaccines like Hepatitis B vaccine. Another area of promise is the biogenerics sector like insulin, erythropoietin for the world market.

Indian Pharmaceutical Industry's capabilities include bioinformatics, organic chemistry syntheses, clinical research on bioavailability and bioequivalence. The areas of improvement are genomics, proteomics medicinal chemistry and animal trials *(Lagnado, 2006).* The new rule enacted by the government of India in Jan 2005, allows multinational companies to conduct trials of the same phase both in India and in other countries simultaneously. Thus with the genetically varied population, reduced costs of trials and companies have made India a clinical research hub *(Nundy et al, 2005).*

CHAPTER 3: LITERATURE REVIEW

The thesis, "A Study of Strategic Alliances between Indian and Foreign Companies with Reference to the Indian Pharmaceutical Industry", traces the trends in the alliances in the Indian pharmaceutical industry over the decades spanning from 1960 to 2010. The last 20 years have transformed an inward looking industry to a globally recognized contributor today.

Alliances in business have a long history, but over the last couple of decades they have become an important feature to such an extent that Dunning, a prominent researcher of multinational enterprises since the 1950's, has described this new trend which gives increased emphasis to cooperation as well as competition between firms as 'alliance' capitalism (*Dunning 1995*). Strategic alliances refer to alliances that enhance the long-term competitive advantage of an enterprise (*Johnston et al, 1988*).They are significantly different from the old style of collaborative agreement and can take many forms(*Delvin & Biggs,1989*). The spectrum includes joint ventures, minority participation, co-manufacturing efforts, cross-marketing, cross distribution, cross-licensing arrangements, supply purchasing, franchising, R&D consortia, and partnerships in marketing and other areas.

The literature review has been discussed under the following heads :

- Global trends in strategic alliances
- Global trends in strategic alliances in pharmaceutical companies
- Strategic Alliances among Indian pharmaceutical companies
- Factors that impact the formation of strategic alliances
- Impact of strategic alliances on various aspects of the business
- Success factors for strategic alliances

3.1 Global Trends in Strategic Alliances

According to *Kesic (2008)*, the world pharmaceutical industry is characterized by increased globalization and increased competitiveness. Increased costs involved in the development of a new drug has led to firms adopting a strategic orientation, leading to fast consolidation and concentration of the world pharmaceutical industry. The investments involved in the development of a brand new drug is more than $1.2 billion and the time taken to bring

a molecule into the market is typically 12 years. The success of the molecule would depend on the marketing and sales activities. Thus, the success of a pharmaceutical company largely depends upon, strong research and development combined with a compelling marketing and sales related activities.

Firms create competitive advantage by perceiving or discovering new and better ways to compete in an industry and bringing them to market, which is ultimately an act of innovation. *Porter (1985)*, indicated that competitive advantage grows out of the value that a firm is able to create for its buyers that exceeds the cost of creating it. Competitive advantage is achieved by cost leadership and differentiation. In *Built to Last, Collins and Porras (1994)* outline habits of long-successful, visionary companies which is, an orientation towards evolutionary change: try a lot of stuff and keep what works. There is no one formula that would suit all the firms, but the core ideology of the company is the fundamental differentiator.

Competitive strategy involves deciding how the company will compete within each line of business unit. *Hamel (1991),* indicated that core competencies and value creating disciplines are not distributed equally among firms, thereby indicating that international strategic alliance might play a crucial role in effecting partial redistribution of skills among partners.

3.1.1 Competitive Advantage and Strategic Alliance:

The pharmaceutical industry in the 1980s evolved to be a global oligopoly with unprecedented strategic activities which included 'mega mergers' and the disappearance of small players(*Langley et al , 2005*). Pharmaceutical industry researchers have tended to focus upon two types of strategy that create competitive advantage for pharmaceutical firms, namely research and development (R&D) and marketing on the basis that new technologies and new successful products improve the competitiveness of firms. The industry was plagued by high level of product failure, a widening gap in the product portfolio and an onslaught of cheaper generic products post patent expiry. There was a strong need among pharmaceutical firms to identify strategies that would reduce costs, strengthen the product pipeline and maximize revenue. Literature suggests two prominent views on competitive advantage: Industry structure view popularized by Porter and the Resource based view.

Porter (1980), indicated that a firm's membership in an industry governs its strategic orientation. Porter develops three potentially successful generic strategies for creating defensible position and outperforming competitors in a given industry.

- Overall cost leadership in consideration with quality and service.
- Differentiation either in product or service that is recognized industry wide as being unique.
- Focus strategy, in which the firm concentrates on a particular group of customers, geographic markets or product line segments.

A second view was creating unique resource combinations that, if valuable, rare, and difficult to imitate, can form the basis for a competitive advantage *(Barney, 1991)*, which is why strategic resources are heterogeneously distributed across firms and that these differences are stable over time. *Peteraf (1993)*, discusses the "Resource – Based" model of competitive advantage, where the cornerstones of competitive advantage are : Resource heterogeneity which creates Ricardian or monopoly rents. She explains that heterogeneity is the basic condition for sustainable competitive advantage, which is not sufficient as firms may have short lived readily imitable differences. So long as its assets are imperfectly mobile: inimitable and non substitutable, other firms will not be able to mimic its strategy. Heterogeneity is a short-lived phenomenon and sustained competitive advantage required the preservation of heterogeneity. *Barney (1986)* argued that the economic performance of firms depends not only on the returns from their strategies but also on the cost of implementing those strategies. This is very true to the pharmaceutical industry, which witnessed a sudden rise of alliances in the 80s. The last decade has witnessed more than 10,000 alliances in the pharmaceutical industry. For instance, Pfizer has been created from five big international players like Pfizer itself, Warner Lambert, Upjohn, Searle and Pharmacia, respectively. The world leading generic player, Teva from Israel, has acquired more than 10 generic companies, like Lemmon, Gry, Prosintex, Biogal, Human, Biocraft, Pharmascience, Copley, Novofarm, Bayer Classics, Sicor and Ivax to form today's Teva *(Kesic 2007)*.

3.2 Global Trends in Strategic Alliances in the Pharmaceutical Industry

The pharmaceutical industry is a knowledge driven industry and is heavily dependent on Research and Development for new products and growth. Since 1930 many large firms have specialized in chemical modifications of basic compounds in the quest to produce new drugs. The resources required to invest in the search for new molecules, conduct clinical trials and market the drug was huge and only large pharmaceutical firms could invest in these activities extensively. *Higgins (2005)* indicated that productivity in the pharmaceutical industry declined in the late 1990s, because more drugs were coming off exclusivity protection than were being replaced by new Food and Drug Administration (FDA) approved products. New products take an average of ten to fifteen years to develop from initial discovery to final FDA approval and the cost of developing a new drug was estimated to be in excess of $800 million in the year 2000 (*DiMasi, 2007*). Pharmaceutical companies have responded to the decline in R&D productivity by: enhancing their internal R&D efforts through acquisition of smaller pharmaceutical and biotech companies, engaging in horizontal mergers to achieve greater economies of scale and scope in their research, acquiring existing mature products through licensing agreements, increasing alliance activity and changing their business models (*Higgins (2006)* , *Kesic (2007*)).

Thus the main reasons for the strategic consolidation of the pharmaceutical industry are: lack of new products, globalization of the world economy, high R&D costs, large investments on global sales and marketing activities, increased competitiveness, reforms in the world healthcare, increased importance of regulation in the global context.
Kesic (2007) argues that pharmaceutical companies make alliances to create common synergies and to better exploit their common assets, knowledge, product life cycle and, to improve their strategic market positions. Thus, the most important strategic activities of pharmaceutical firms include: R&D to create new products, development of products to gain market shares, acquire new markets through geographic expansion, organize and streamline marketing and sales activities to compete on the global markets, develop financial strength to create common cost reduction synergies and investment capabilities *(Dyer, 1998).*

In 1960s Discovery was by design. Today despite significant investments in pipeline management and novel technologies, there is still no recipe to ensure a block buster hit. R&D productivity, the ratio of input R&D versus its output, is suboptimal in the pharmaceutical industry. This is attributed to:

1. Increased costs of R&D, driven by larger and more complex clinical studies
2. Decline in per drug productivity
3. Over supply of "me too" products or undifferentiated products which are also called as generic molecules
4. Lack of new promising molecules in the pipe- line, and long development times

3.2.1 Strategies for Growth

Strategic actions that have been discussed in pharmaceutical literature can be categorized as corporate, global, network, marketing, research & development and investment strategies (*Langley, 2005*). Companies can adopt different strategies based on their strategic orientation and business plans. The growth strategy concentrates on growth of the organization and the various types of growth strategies can be categorized under six heads based on their strategic action points and implications.

Illustration 2: Mapping Pharmaceutical Strategic Actions with Related Strategies

Strategic Actions	Related Strategy
Mergers, acquisitions, vertical integration, retrenchment, divestment, diversification, creation of spin- off companies	Corporate strategy
Niche marketing, advertising, "detailing" by sales representatives, marketing and distribution networks, co marketing agreements	Marketing strategy
Licensing agreements, R&D alliances, establishment of overseas R&D function, focus upon 'minor local products', 'me too' R&D Strategies	Research & Development (R&D) strategy
Raising additional funds, investing in other companies	Investment strategy
Licensing strategies, outsourcing, strategic alliances, joint ventures, co marketing agreements	Network strategy
Establishment of overseas subsidiaries and R&D facilities, cross border mergers and acquisitions, cross border co operative arrangements, co - marketing agreements	Globalization strategy

Source : Compiled from Langley et al (2005)

3.2.2. Strategies Adopted by Pharmaceutical Companies

The grand strategies adopted by the pharmaceutical companies can be a source of competitive advantage, *Pearce and Robinson (2003),* have proposed 14 grand strategies which were followed by the firms in the pharmaceutical industry during 2001 and 2002 which were grouped as follows,

Langley et al(2002), have developed upon Pearce and Robinson's identification of 14 grand strategies in the pharmaceutical industry and have extended them. They are tabulated as follows:

Illustration 3 : Grand Strategies Implemented by Pharmaceutical firms 2001- 2002

1	Organic concentration (market penetration)
2	Co operative concentration (market penetration)
3	Organic market development
4	Cooperative market development
5	Organic product development (R&D)
6	Cooperative market development (R&D)
7	Acquisition based product development
8	Organic innovation (R&D)
9	Cooperative innovation (R&D)
10	Organic innovation (Information Technology)
11	Cooperative innovation (Information Technology)
12	Horizontal integration
13	Vertical integration
14	Joint venture
15	Organic concentric diversification
16	M&A Concentric diversification
17	Conglomerate diversification
18	Turnaround / organic growth / retrenchment
19	Divestment
20	Liquidation
21	External finance raising
Source : Compiled from Langley et al (2005)	

Higgins (2006), found evidence to suggest that firms experiencing declines in internal productivity engage in outsourcing of R&D, in an effort to replenish their research pipeline. One of the method of outsourcing R&D is through mergers and acquisitions which was prevalent in the 1990s.Acquisition of latest external technologies ensures that pharmaceutical companies bridge their research gaps. *Mc Cutchen (2004)*, studied the motivating factors for strategic alliances among small and large firms. He argued that the motivations of strategic alliances change with time, while in the 80s 90s the key factor was market access and risk mitigation. The motivational factors depend upon the size of the firms as well. Small firms need capital to deal with regulatory bodies, clinical testing, downstream processing and establishing marketing capabilities. The larger firms need the technological expertise and additional resource of new products hence are always on a lookout for new strategic partners.

3.2.3 Strategic Alliance between Indian and Foreign Pharmaceutical Companies

Over the years the Indian pharmaceutical companies have used multiple strategies to build the pharmaceutical industry in India. Before the signing of the TRIPS, the strategy was to make use of the product patent regime and produce new drugs through reverse engineering as the process patent was not applicable in India. Pharmaceutical companies produced drugs for the domestic consumption, which generated business and helped the companies to expand their facilities and look outwards by exporting essential medicines to third world countries. This was in line with observations from *Hamel and Prahalad (1994)*, who indicated that firms should develop a portfolio of core competencies. According to *Sampath (2005),* the major strength of the Indian pharmaceutical company was the cost competitive manufacturing base and the extensive skill in chemistry. He has identified the strategies adopted by Indian firms as:

- R&D Strategies
- Competitive strategies
- Collaborative strategies

The R&D strategies of Group 1 firms are driven by the need for entry and establishment in the regulated markets. Hence the strategy would be greater investment into R&D to generate innovative generic products, process and bulk drugs. Group 2 firms are driven by the need to strengthen competitive advantages, make use of CRAM opportunities, to take advantage of the business. Their strategic orientation would be towards generating active supply of off- patent generics to the unregulated and semi regulated markets and establish themselves as niche players in contract research, by choosing specific areas like – clinical research, domestic marketing etc. Group 3 firms are driven by the need to survive in the scenario of complete TRIPS compliance, thus leading towards the up gradation of facilities to continue being outsource centers for Group 1 and 2 firms. The competitive strategies adopted by Indian companies are centered around R&D involving research on new chemical entities, non infringing processes, novel drug delivery systems generics and specialty generics for regulated market and biopharmaceutical research.

The main emerging collaborative strategies adopted by Indian firms are - In licensing arrangements, collaborative R&D and contract research.

3.2.4 Need for Strategic Alliances in the Indian Pharmaceutical Industry

The Indian pharmaceutical industry ranks very high among developing countries, in terms of technology and quality, and is today in the front rank of India's science based industries *(DIPP, 2005)*. The growth of the Indian pharmaceutical industry has been remarkable. From 1947 to 1970; the Indian pharmaceutical industry was small in terms of number of firms and production capacities. In the 1950s the Indian pharmaceutical industry was mainly based on imported bulk, which was later processed into formulations in India *(Bergman, 2006)*. India sensed a strong need to develop and strengthen the pharmaceutical industry to meet the demands of its millions. A crucial aspect of the Indian Pharmaceutical Industry is the role played by the Multinationals. They brought in foreign capital and technological knowhow into the sector. They also established collaborative relationship with the local Indian firms.

The 1978 drug policy imposed conditions on foreign controlled firms and the Indian companies took advantage of the new policies and produced molecules that were still under patent

elsewhere, thus creating technological competence among the Indian firms and satisfying the demands of the domestic market. In the 1980s the government implemented a new drug policy. Technological obsolescence and the need to modernize the market were the critical factors that initiated the need for the new drug policy. The policy reduced the trade barriers and opened the doors for liberalization in 1991. In 1995, India joined the WTO TRIPS agreement and that was the turning point for the pharmaceutical industry in India, which has opened the door to innovation in this sector *Bergman (2006*).

The study conducted by *Beena (2008),* indicated that, the Indian pharmaceutical industry experienced greater consolidation through mergers, acquisitions, alliances as well as sale of assets, which was very similar to the global trend. One of the major motives of the strategy is capacity expansion. Majority of the firms are using merger as a means to expand their product profile and thus to remain risk free.

Thus the need for the alliances were two way: Indian firms needed the technological knowhow and foreign firms were on the lookout for a foothold in the huge domestic market in India. Additionally there was the attractiveness of available resources and plant capacities which could be utilized to produce drugs in large capacities to meet global demands.

It is evident that many of the Indian pharmaceutical companies have undertaken alliances with companies in foreign country; inward alliances between multinationals or with other domestic companies. These alliances have a definite clear objective. Many of the alliances have been successful for many years and have fulfilled their original purpose. The study of the alliances undertaken by the top 5 Indian Pharmaceutical companies indicates some interesting aspects.

- Highly successful companies have entered into multiple alliances and have used alliance to time and again fulfil their business objectives – new market entry, develop generics production capability or develop new molecules.
- The alliances are not restricted to foreign companies alone. Competing companies have undertaken alliance to achieve a particular business interest which is of mutual interest.
- The objectives of the alliances can be grouped into the following categories:

- Acquiring manufacturing capabilities
  - Overseas in regulated (US, UK, France) and non-regulated markets (Nigeria, Malaysia etc)
  - Contract manufacturing for MNCs locally
- Generic Business capability
  - Supply locally from India
  - Develop manufacturing capabilities at host country
- Marketing
  - Specific therapeutic segment
  - Co- Marketing in a geography
- Research and Development
  - Screen new chemical entities
  - Develop and commercialize promising molecules
  - Clinical Trials
  - New drug delivery systems
- Access to emerging markets

3.2.5 Inward and Outward Alliances

Need for alliances emerge out of a company's basic mission and vision, and are used to fulfill long term objectives and achieve future competitive advantages. Foreign corporations are allowed to collaborate with Indian businesses in three basic ways: (1) licensing of technology where no equity capital is involved; (2) joint venture with foreign equity capital; and (3) outright purchase of technical know-how in the form of design and drawings.

Data on alliances indicate that alliances between Indian pharmaceutical companies and foreign companies has evolved through different stages in the last four decades. The strategic alliances that took place in Indian pharmaceutical industry can be broadly classified as:

- Outward FDI - Indian firms entering into alliances abroad
- Inward FDI - Foreign firms entering into alliances in India

3.3 Factors that Impact Strategic Alliances

Parvartiyar and Gupta (1994), discusses the payoffs in Indo –US strategic alliance that have happened in the 1990s. According to them, only those actions aimed at altering the strength of the company relative to that of its competitors can be considered as part of strategy. The spectrum includes joint ventures, minority participation, co-manufacturing efforts, cross-marketing, cross distribution, cross-licensing arrangements, supply purchasing, franchising, R&D consortia, and partnerships in marketing and other areas. The Indian partners seek the benefit of technology available in the US, while their American counterparts like to achieve synergistic payoffs using the low labor cost in India. Both partners have defined roles. The Indian company concentrates on manufacturing quality products, and the necessary training is provided by the US partner.

The benefits sought by Indian companies through alliances are listed as:

- Availability of latest technology
- Worldwide information on technology and products can be obtained through the alliance partner
- Exposure to large global market
- The ability to become part of a global supply network, thereby obtaining large volume production, less machine downtime due to economic production
- Gain knowledge on systems and processes for planning, operations and control.
- Higher credibility in the domestic market
- Develop a culture with total quality consciousness and market orientation

The benefits sought by foreign companies through Indian alliances are:

- Entry into the Indian market, in some instances the Indian government has limited the entry mode, thus joint ventures being the route adopted
- Setting up production base to serve Far East, USSR, Africa and South Asia
- Low labor cost
- Availability of cheap raw materials and skilled manpower
- Obtain local market knowledge of Indian partners

- Capitalise on goodwill of local partners for further ventures and regular relationships
- Avoid creating future competitor of an Indian partner

With a lack of new blockbuster drugs in the pipeline, the global pharmaceutical industry is increasingly under financial pressure. According to a report released by the US Government Accountability Office, between 1993 and 2004 annual R&D spending by the pharmaceutical companies increased by 147%, to nearly $40 billion *(Dragan, 2008).* Yet during this period, new drug applications to the US Food and Drug Administration grew by only 38%, nearly two-thirds of the new applications were for drugs that were modifications of existing medicines with only one-third for innovative new drugs. Such financial pressure explains in part why big pharmaceutical companies were rushing to set up collaborations with local companies in cost-effective locations like India. In addition, a significant pool of trained biomedical and chemistry professionals, a strong bioinformatics tradition, and a large genetically diverse population from which to recruit patients for clinical trials, *Bartlett & Ghosal (1989)* makes India an attractive destination for alliances.

The pharmaceutical companies have been compelled to move towards globalization for the following reasons: lack of new products to drive sales growth, huge investments needed for R&D, increased competitiveness, increased importance of regulatory issues, world reforms of healthcare system. According to *Kesic(2009),* there have been more than 10,000 alliancing processes in the last decade in the world pharmaceutical industry (*Datamonitor, 2005*). It has been found that the consolidation and alliancing processes have been carried out practically in all three segments of the world pharmaceutical industry (inventive – original pharmaceutical companies, generic producers and specialists). The alliancing process has churned the entire industry mitigating the identity of some firms and has led to the emergence of new firms. *Pradhan and Alakshendra (2006*), indicated that a variety of factors like liberalization of domestic policies, strong intellectual property right regime, increased competitive pressures and emerging new global market opportunities have instigated the Indian pharmaceutical industry towards rapid globalization.

Some clear cut objectives of the alliances that emerged were as follows:

- Accessing firm specific Strategic assets like international USFDA approved manufacturing facilities
- Acquiring new products and brands
- Accessing advanced research capabilities
- Gaining Access to new markets
- Achieving operating synergies
- Contract manufacturing
- Outsourcing research and manufacturing of intermediaries

Hagedoorn (1993), has studied the motives for strategic (technology) alliances, he has identified broadly 3 groups of motives for inter-firm cooperation.

The first group is related to the sharing and further advancement of research, increased complexity and inter-sectoral nature of new technologies, cross fertilization of scientific knowledge for instance the growing interrelationship between chemistry, physics, biology and computer science increases the need for close collaboration between these companies. The increase in the costs of R&D in a large number of fields has further encouraged this aspect.

The second group of motives is related to the concrete innovative projects in a joint activity of two or more companies. Capturing the partner's tacit knowledge of technology, and innovative capability to enable technology transfer is the primary motive. Another motive that is considered here is the reduction of the total period of product–life–cycle and the contraction of the period between invention and market introduction.

The third group of motives is linked to the market access and technology development through the combined effort of companies. Combining some activities of two geographically separated firms for particular markets favors internationalization and globalization of companies.

Unlike most tangible physical resources which depreciate with use, a firm's skills of using technology and the technology itself actually improve with more practice, thus transferring technology through strategic alliances to other firm irons out the technical problems

encountered in application. The R&D cost incurred by a pharmaceutical company in developing a new drug is astronomical and mired with uncertainty. Thus there is a need to share the risks and project cost by collaborating and reducing risks. Although there is a possibility of pooling resources and reducing costs, the pressures of cultures and work procedures between collaborating companies can complicate decision making and thereby add onto the administrative costs. Strategic alliances dominated by the imitation motive are less stable than ones formed by other motives and are dependent on the absorptive capacity of the firm. While studying the strategic alliances among Indian pharmaceutical companies, they seem to be outcomes of clearly defined objectives.

There is a lot of literature that have identified the various contributing factors for alliance formation. The focus of alliance have always been market access, technology acquisition, financial support, political insurance and competitive reality (*Barrie, 1985*). *Varadarajan and Cunningham (1995),* have indicated that the main motive for partnership between firms is the pooling of specific resources and skills. Alliances create value which is an ongoing process especially by fostering close interfirm ties which create more opportunity to exploit technology, marketing and other aspects. *Wang and Zajac(2007*), indicate that in today's business environment, firms constantly assess and reassess their own portfolios of resources and capabilities, and are typically open to the opportunities presented in the environment, including the opportunity to combine resources with other firms. They have focused on three types of paired - firm characteristics: (1) resource similarity and complementarity between two firms, (2) the combined relational capabilities of two firms and (3) the partner specific knowledge of two firms.

Competitive advantage: Alliances gives access to new technology which can ultimately lead to better value addition to customers, thereby enhancing competitive advantage of a firm. *Silverman & Baum (*2002) have explored the competitive implications of alliances, and have indicated that rivals'alliance puts a pressure on competing firm. *Hess (2005),* indicated that with the onset of patent expiry, branded drug companies need to opt for more defensive

strategies to combat the generic competitors. *Narula & Dunning (1998)* have observed an increase in alliances across all of the advanced industrialised economies and the nature of the alliances are strategic.

Alliances are no longer simply undertaken as a means of avoiding transaction and coordination costs of markets. *Nerkar & Roberts (2004),* indicated that the growth and development of a firm is dependent on its ability to introduce new products over time which requires technological knowledge, the ability to combine knowledge elements into valuable new products and complementary assets that facilitate the manufacturing, sales, and distribution of those products. They indicate that inventions are the result of combining or recombining existing elements of knowledge into new syntheses and an invention becomes a successful innovation if it has a marketable use. *Eisenhardt & Martin (2000),* identified dynamic capabilities as a set of specific and identifiable processes such as product development, strategic decision making and alliancing, which have significant commonalities across firms and are homogeneous, equifinal and substitutable, commonly known as best practices.

Researchers have theorized that when firms have resources that are valuable, rare, inimitable, and non-substitutable (so-called VRIN attributes), they can achieve sustainable competitive advantage by implementing fresh value-creating strategies that cannot be easily duplicated by competing firms. Dynamic capabilities are complicated, detailed, analytic processes that rely extensively on existing knowledge and linear execution to produce predictable outcomes. They indicate that dynamic capabilities are the antecedent organizational and strategic routines by which managers alter their resource base—acquire and shed resources, integrate them together, and recombine them—to generate new value-creating strategies.

Acquire market access: One of the original motives for alliance formation was to acquire market access and/or overcome supply bottlenecks, i.e., to achieve vertical integration where such integration was not possible through hierarchies. *Narula & Dunning (1998),* indicate that inter-firm alliances are increasingly being undertaken, through various modes, as a direct response to pressures brought about by contemporary technological developments and globalisation.

*Rothaermal (*2001), indicated that firms entering into alliances look out for complementary assets which are advantageous to each other, especially so in the biopharmaceutical industry which is technologically very competitive and ever changing.

Globalization: *Contractor & Lorange (2002),* attempted to identify the environmental and regulatory conditions that have fostered the growth of alliances. They indicate that the fear of alliance formation is mitigated by two regulatory and environmental factors:

1. The global spread of the system of intellectual property protection under the aegis of TRIPS, a protocol of the World Trade Organization, which reduces the fear of misappropriation.
2. Greater articulation and codification of knowledge, which reduces the costs of its transfer to allies which is aided by broad-based adaptation of information technology.

Harmonization of standards and reciprocal acceptance of data has encouraged some of the recent alliances. Consistent application of intellectual property laws and continuous talks with the WTO lead to greater harmonization. This phenomenon is evident in the pharmaceutical industry where trials in different nations can be pooled and interpreted, thus allowing nations to accept the data collected in different places. Focus on "core-competence" makes it necessary for external knowledge acquisition, which is obtained by alliances. They have also indicated that alliances can reduce the escalating R&D costs and risks as risks are shared in collaborative R&D.

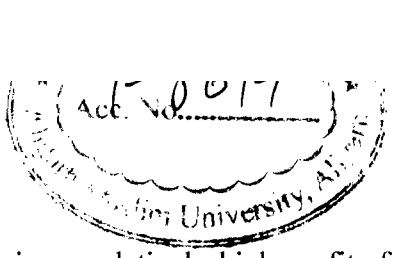
Cost of research: The process of research is a time consuming and expensive process. According to *Cohen and Levinthal (1989),* the two facets of R&D: it not only generates new information but also enhances the firm's ability to assimilate and exploit existing information. Thus R&D generates innovations and also develops a firm's ability to identify, assimilate and exploit knowledge from the environment thereby enhancing the firm's learning and absorptive capacity.

Relationships: Combined relational capabilities of two firms would determine the alliance or acquisition which is dependent not only on the strategic needs of firms to combine their resources but also on relevant capabilities. Relational capability of a firm refers to its ability to

interact with and manage other firms in inter-firm relationships. Once a firm develops certain relational capabilities, it is more likely to exploit them by establishing more interfirm relationships with other firms, thereby gaining economic benefits *Wang and Zajac (2007).*

Collins and Hitt (2006), indicate that in highly competitive industries, firms need to focus on proactively managing their knowledge resources to ensure survival, although the knowledge management process may be difficult as it involves tacit knowledge. The transfer of tacit knowledge is facilitated by the relational capital between the collaborators. They explain how firms use relational capabilities to build relation capital with partners. They acknowledge that knowledge transfer is facilitated by repeated interaction among partnering firms and explore the need for firms to recognize the importance of inter-personal dynamics involved in the transfer of tacit knowledge. Tacit knowledge transfer requires greater trust between partners than does explicit knowledge transfer and building relational capital involves development of trust, information sharing and joint problem solving.

High profits from innovations: *Roberts (1999),* indicated that sustained high profitability may result when a firm repeatedly introduces valuable innovations that service previously unmet consumer demands. While the returns to the firm from each innovation may erode over time, innovation ensures that, overall the firm maintains a high performance position. His framework for firm-level profit persistence embraces product innovation, product–market competition and more importantly, the prospect that numerous product innovations may be embodied within a single firm. Innovation and anti- competition are identified as two explanations for firm level persistent profitability. An innovative new product tends to face low competition at the point of introduction and therefore earns relatively high profits. These high profits attract imitators, which increase the level of competition faced by the product as time passes. According to an *anticompetition* explanation, a firm may introduce an innovative product (or group of products) that is buffered from the competition that otherwise erodes the high profits associated with its introduction. On the other hand, an *innovation* explanation recognizes that relatively high profits may persist at the firm level even though competition is relatively intense. In such a case, the excess profits associated with any single innovation are transitory, but firms successfully introduce multiple innovations over time.



Van Reenen (1993), suggested that firms experience relatively high profits from innovations. They have also observed that profit margins of innovating firms are less sensitive to cyclical downturns than those of non innovators. They have observed that innovators are likely to be quicker, more flexible, more capable and more adaptable in dealing with market pressures.

Dynamic Technological changes: *Rothaermal (2001)* indicated that radical technological breakthrough is the reason when incumbent firms are forced to adapt to survive. Incumbent firms acquire the new technology through licensing agreements, strategic alliances, joint ventures and acquisitions. *Nerkar and Roberts (2004)* have suggested that the growth and development of a firm depends on the ability to introduce new products, whose success is dependent upon superior technological knowledge and marketing capabilities.

McCutchen Jr.& Swamidass (2004), conducted an exploratory study to investigate the motivations of strategic alliances among small and large pharmaceutical and biotech licensors and licensees. They have referred to many reasons that motivate the formation of strategic alliances, including the aspect of synergy where the alliance is a symbiotic relationship between two firms.

The most critical outcome of the research is that their results were in consistent with Hagedoorn (1993), where the primary motive for an alliance was concluded to be technology. R&D time – span reduction and financial aspects were the other identified reasons for alliances in the pharmaceutical industry. Some of the conclusions drawn throw light on the unique disposition of the small firms in the pharmaceutical industry. They have demonstrated that the licensees seek new products to improve their competitive position and gain access to new markets. Pharmaceutical industry's small firms are often technologically advanced and may have a small scale of operation when compared to large firm. Their findings show that firm size, which serves as a proxy for firm capabilities, has a significant influence on the motivations for strategic alliances in this industry. They also conclude that the ownership of technology (licensor vs. licensee) also influences the motivations for strategic alliances.

According to *Katila and Mang* (2003), factors that speed up collaboration in the biopharmaceutical industry includes: patent protection, high intensity of Research and

Development of the discovering firm, partnering firms' prior exposure to alliance and finally the infrastructure in the industry. Government initiatives to promote entrepreneurial activities in the pharma-biotech sector have been effective as they have also indirectly influenced the infrastructure development like building of biotech parks and increasing intellectual property protection.

To summarize, the factors that have influenced the alliance formation among companies are represented in the table below. (Adapted from: *Contractor and Lorange , 2002*)

Illustration 4 : Reasons for Alliances

1. Governmental Policy related factors
i. Intellectual properties
ii. Deregulation and Economic liberalization
2. Gaining competitive advantage
i. Growth strategy
ii. Mimic competition
iii. Gain access to key attributes
3. Globalization
i. New market access
ii. International harmonization of standards
4.Cost related aspects
i. Cost of production
ii. Cost of R&D
iii. Cost of marketing and distribution
5. Innovations
i. Achieve high profits
ii. Achieve vertical integration
6. Technology and knowledge management related
i. Rapid advances in technology – related to lifescience
ii. Increasing role of information technology
iii. Strategic importance of speed

3.4 Impact of Strategic Alliances

Alliances, which are a consequence of growth strategy and which are clearly envisioned and implemented, can prove to be beneficial to both the alliance partners. This is especially the case when there is a transfer of resource from a parent firm to a host firm. *James (2002),* discusses the resource based view which has led to positive outcomes of alliances. Firm specific assets, which are distinctive and accumulated over time, can be exchanged which can lead to business benefits. Innovations are often a result of combined capabilities of alliancing firms. *Hamel (1991)*, described that in competitive collaboration, the primary objective of the strategic alliance is to internalize the partner skills. He proposed that the alliance partner who understand the co-relation between inter-partner learning, bargaining power and competitiveness will view the alliance as a learning ground. Two major determinants of learning are transparency and receptiveness.

Research and Technology :*Porter (1996)*, indicated that management tools and techniques: total quality management, benchmarking, time based competition, outsourcing, partnering, re-engineering, change management, have resulted in dramatic operational improvement across the globe. This is especially true in high technology industries like pharmaceuticals. Positive aspects namely global generation of innovations which results from R&D and innovative activities both in the home and host countries are outcomes of strategic alliances, *Archibugi and Pietrobelli(2002)*. Additionally, strategic alliances help in the global techno-scientific collaborations involving joint scientific projects and R&D network.

Marketing

Marketing is one of the reasons which has prompted the formation of alliances in the pharmaceutical industry. The pharmaceutical R&D companies, who are into discovery, develop new and promising molecules. Commercialization of the molecule, generating a market, promoting and managing the sales is a completely different aspect, which requires skill and resource. Thus big pharmaceutical companies enter into alliance with R&D firms where the R&D firms develop new molecules and the big pharmaceutical companies look after the commercial aspects. Many companies also enter into alliances for distribution

purposes. With respect to the Indian pharmaceutical industry, the alliances have changed the scenario of the industry in the last 20 years. The alliances have impacted the way the Indian pharmaceutical companies approach marketing.

New Product Development

Deeds and Hill (1996), have demonstrated that strategic alliances are positively related to new product development. They have built on the premise that new product development involves integration of a number of complementary assets and strategic alliances are a quick and effective way to achieve them. There is a parabolic relationship, wherein initially strategic alliance are viable for firms to gain access to assets that increase their new product development, however if the firm enters into too many alliances, negative results may set in.

Competitive Advantage

*Bala and Sagoo (*2000), have studied the impact of patents on the availability and prices of essential drugs in developing countries. Competition in the pharmaceutical market brings down prices as the originator firm will bring down prices to compete with the local generic firm. Thus when more and more firms are involved in alliances and build their capacity, there will be a positive effect on the price of the pharmaceutical drugs. *Lanjouw*(2005) has given evidence that show high levels of patent protection encourages the launch of innovative products, especially in countries where MNCs have to encounter local technical capacities. Patent protection indirectly aids alliance formation, which aids in enhancing the production of the molecule and indirectly impacts price and availability of the molecule.

Shrank et al (2006), demonstrated that for chronic ailments, generic pharmaceutical products have proven to be having less amount of patient drop outs. Thus pointing to a fact that it becomes very critical for an originator firm to look at generic options if the patients need to be "locked into" the therapy. *Drews(2003),* has indicated that productivity of the pharmaceutical industry has fallen short dramatically, that is the number of novel

compounds are depleting thus pushing big pharmaceutical companies to come together trough alliances to acquire new product lines to strengthen their portfolio.

With the aspects of globalization and certain typical challenges that is faced by the pharmaceutical industry, marketing skills and practices stems from the central organization and is transferred to local affiliates. The transference is a product of training which involves both technical aspects as well as skills development.

Chandon (2004), has described the strategic options available to a innovator firm after the patent expiry. Divesting is strategy adopted where the brand is not supported but generates revenue due to the inertia of doctors to switch to new generics. Innovation is another strategy that can be adopted by offering new and better services, new dosage combinations, new delivery systems etc. Introducing generic products either directly or by licensing is also a approach taken by innovator companies, to make the most out of the scenario.

Thus the impact of alliances on the can be summarized as follows

Illustration 5 : Impact of Alliances on Business Aspects of Pharmaceutical Companies

1. Product
i. New product development
ii. New product launches – domestic and international markets
iii. Enhanced product portfolio
2. Marketing
i. Access to new markets
ii. Enhanced sales promotional activities and spend
iii. New distribution channels
3 Technology
i. Access to new technology
ii. R&D capability
iii. GMP manufacturing facilities knowhow
4 Manufacturing
i. Cost optimization
ii. Quality management techniques
iii. Common asset and operational synergy
5 Competitive advantage

i. Increased market share
ii. Increased profitability
iii. Intellectual and managerial skills

3.5 Success Factors for Alliances

Two types of uncertainties in alliances: uncertainty regarding future events and uncertainty regarding partner's responses to those future events. Alliances involve considerable investment of resources and need to be nurtured and managed well, if they are to be successful. Trust between partners forms the basis of any successful alliance. Trust is defined as the mutual confidence that neither party will exploit another's vulnerabilities; violation of expected behaviours can cause disruption of trust leading to profound confusion. Distrust arises when there is suspicion of intentional violation of expectations. A weak trust is developed when there are limited opportunities for opportunism wherein, the partners can have the mutual confidence that others will not exploit their vulnerabilities because they have no significant vulnerabilities. Semi-strong levels of trust, emerges even when significant vulnerabilities exist, if parties to an alliance are protected through various governance devices. Strong form trust emerges in the face of significant vulnerabilities, independent of whether or not elaborate social and economic governance devices exist, because opportunistic behavior would violate values, principles, and standards of behavior that have been internalized by alliance partners. *Parkhe (1998),* indicates that trust plays a dominant role in successful alliances. Successful adaptation calls for a delicate balance between the twin virtues of reliability and flexibility. Flexibility is necessary for partners to have a viable relationship in the face of changing circumstances, yet unlimited flexibility affords companies the opportunity and incentive to cheat, reducing the partners trust on each other.

*Hyder and Ghauri (2000),*have indicated that during the early stages of the alliance, there exists a lot of uncertainties among the alliancing firms, as they are gauging each others capabilities. Resources are committed when the 2 parties establish a relationship with each other. Relationship is strengthened through openness and access to each other's resources. Two attributes that affect post-formation dynamics are the scope of collaborative activity and division of labour among partners (*Reuer and Zollo, 2000).*

Doz(1996), identified four factors which are key determinants of an evolving partnership: the definition of the tasks to be jointly performed by the organizations, the alliancing firms' respective organizational routines, the interface between the alliancing firms and finally the expectation each firm has on the alliance.

Developing relationships between the partners is critical as this is can involve formal and informal transfer of knowledge which is an important factor determining the success of an alliance. Highly competitive industries, firms need to focus on proactively managing their knowledge resources to ensure survival, although the knowledge management process may be difficult as it involves tacit knowledge, *Collins and Hitt (2006).* The transfer of tacit knowledge is facilitated by the relational capital between the collaborators. They explain how firms use relational capabilities to build relation capital with partners. They acknowledge that knowledge transfer is facilitated by repeated interaction among partnering firms and explore the need for firms to recognize the importance of inter-personal dynamics involved in the transfer of tacit knowledge. Tacit knowledge transfer requires greater trust between partners than does explicit knowledge transfer and building relational capital involves development of trust, information sharing and joint problem solving. Specific governance changes firms make in strategic alliances and explore some of the factors affecting parent firms' interventions in their collaborative agreements, *Reuer and Zollo (2000).* They indicated that like acquisitions, many alliances falter at the juncture between alliance formation and implementation. They indicate that governance changes in strategic alliances are a critical factor that influences alliance termination and parent firm's intervention in collaborative agreement. Governance changes in alliances can stem from intense competition or changes in rivalry. Other factors that affect the post formation dynamics of alliances are scope of collaborative activity and division of labor among partners.

Liberalization of restrictions on foreign direct investment has historically been one reason behind equity changes in market entry of international joint ventures in developing countries. Foreign exchange rate movements can be another source of instability in alliances. Prior alliances with a partner, for instance, allow firms to better understand partners' routines for managing collaborative processes.

Baker, Gibbons and Murphy (2008), have illustrated that two important factors that determine the form and performance of strategic alliances are – spillovers from joint project into parents and the need for governance. *Serapio and Cascio(1996),* have found that alliances are terminated for one or more of six reasons:

- Differences between partners, people and managerial styles
- Unsuccessful venture
- Breach of agreement
- Nonfitment of goals and strategies
- Financial difficulties
- Achieving the original objective of the alliance

Douma et al(2000), identify different aspects of fit and their interrelationships, as well as provides an insight into the drivers for fit. Alliances are knowledge intensive and have moved away from the traditional cost-driven model. Inspite of this many alliances do not deliver the value expected by the strategic partners. Alliance success depends on an effective and efficient alignment (in other words, fit) between the partners involved. Fit is very much related to concepts such as complementary balance, mutual benefits, harmony. They have identified five aspects of mutual relationship: Strategic fit, Organizational fit, Cultural fit, Operational fit and Human fit.

Strategic fit involves six drivers, sharing a common vision, having a compatibility of strategies, mutual dependency, market acceptability of the alliances, should add value for the partners and their customers, and finally the alliance should be of strategic importance to both the partners. The drivers for organizational fit includes: addressing organizational similarities and differences in the alliance, providing for strategic and organizational flexibility, reducing the design complexity, enabling effective management control by both partners, overcoming potential strategic conflicts and enabling partners achieve their strategic objectives.

*James (*2002) has indicated that there are challenges of managing resources and capabilities in an alliance, which stems from organizational and cultural barriers. Alliances

especially mergers and acquisitions, do extract a heavy price from the on going business activities, due to disruptions caused by loss of staff, break up of teams, dip in morale and loss of business due to lack of focus. Management of the integration process is critical for the success of any alliance. Imperfect information of the various aspects of the organization can influence the integration process. Sense of inertia and a propensity to hold on to original beliefs on the employees part can often create barriers in the integration process which will eventually delay the process. Alliances can cause cultural clashes and intra- organizational battles between competing business and executives, which can lead to the exit of manpower.

Thus alliance is not an end by itself, the success of an alliance is an elaborate procedure, which involves involvement of management at all levels. Trust is the most important factor which determines the success of the alliance. Understanding the fit and strategic goal is critical for the success of the alliance. Day to day functioning and governance need to be handled effectively as they would impact the smooth functioning of the organization. In addition, external factors like regulation and liberalization may also play a role in the continuance of an alliance.

Illustration 6 : Factors Affecting the Success of Alliances

1. External factors
i. Legal and regulatory policies
ii. Currency related aspects
2. Strategic fit
i. Strategic fit
ii. Organisational fit
iii. Cultural fit
3. Governance
i. Day to day operations
ii. Communication
4. Trust
i. Formal and informal relationships
ii. Collaborative activities

3.6 Conclusion and Research Gaps:

Strategic alliance between Indian and foreign pharmaceuticals is a phenomenon that is here to stay for many more years in the future. Literature has discussed extensively the driving factors for the alliances and the trend of alliances in the 5 decades starting from 1960 till 2010.

Research gaps that have been identified are as follows: Considerable literature is available on the strategic alliances that have taken place among pharmaceutical companies abroad. The studies have analyzed the reasons for the alliances, the trends and outcome of the alliances. There is no study available on the outcome of the alliances on various factors like business, customers and employees. The alliances are considered to be beneficial as they are formed to meet a business objective and after the objective is realized, they are termed as successful. However the impact on employees is not studied in depth.

When it comes to the context of the Indian pharmaceutical companies, the gaps in the literature are far more obvious. *Beena, Smith, Pradhan, Greene, Langley* are some of the researchers who have contributed in understanding the trends in strategic alliances in India and the factors that have led to the formation of alliances. For instance, many of them refer to the liberalization policy of 1991, and the accession to TRIPS are two important reasons. There is no study available which discussed the impact of the alliances on the Indian companies. Companies have grown, achieving high turnovers, accruing huge investments, diversifying into contract research and R&D, are these the outcomes of alliances, or natural transition of Indian pharmaceutical companies? With regards to the reasons for the formation of alliances between Indian and foreign pharmaceutical companies, many causes have been identified. Literature has given a number of evidences like reduced costs, scientific talent etc. However there is no formal study which pinpoints the actual reason for the alliances. Additionally, the kind of alliance undertaken by a particular enterprise is critical. Small pharmaceutical company may undertake alliance with a foreign partner for a completely different reason in comparison to a large innovator Indian pharmaceutical firm. There is no correlation between the kind of company and the alliance undertaken.

The study attempts to understand and analyze the trends on strategic alliances between Indian and foreign pharmaceutical companies. Although many researchers have commented on this topic, the data is limited up to 2006 only. Many alliances have happened post 2006, which needs to be considered as well. There is no study which traces the objectives of alliance that have happened in each decade starting from 1950 with regards to Indian pharmaceutical companies.

The first objective of the study is to analyze the various factors that have led to the formation of alliances between Indian and foreign pharmaceutical companies. There are a number of factors like economic factors, technological aspects that have contributed to the alliances. Although there are many literature references to the politico – legal situation which opened up the economy and made business lucrative in India, there are no studies which actually discusses this. There are indications on some critical aspects that have led to alliance formation between Indian and foreign pharmaceutical companies like : Products, Marketing, Manufacturing, Technology and Competitive advantage. There is no formal study incorporating aspects of these 5 areas into strategic alliances.

The second objective of the study aims at understanding the business implications of the strategic alliances between Indian and foreign pharmaceutical companies. There are many researches that have discussed the alliances and their formation, however implications of the alliances is a subject with very little work. This is especially so in case of Indian scenario. There is no study which discusses the major business area that is impacted the most during an alliance. The most important stake holder namely the employee and the impact the alliance has on him is again a topic with no available literature. The alliances that have occurred in the Indian pharmaceutical industry has been beneficial to a large extent. They also have some negative implications. There is no available literature that discusses these crucial aspects. One of the research questions is to address the benefits and detriments of the alliances that have occurred between Indian and foreign pharmaceutical companies.

The third objective of the study is to understand and evaluate the factors that are critical for a successful alliance. Alliances are the outcome of a strategic business objective and involve

investments. Hence their objective success is critical for every organization that is part of the alliance. Although there are literature which have referred to critical success factors of an alliance, literature with respect to success factors for alliance between Indian and foreign pharmaceutical companies is not available.

Thus to summarize, the literature gaps identified are depicted in the table as follows.

Illustration 7: Literature Gaps

Literature Gaps Identified
1. Trends Strategic alliances between Indian and foreign pharmaceutical companies
i. No decade wise analysis
ii. Data is available till 2006 only
iii. No study on the objectives of the alliances is available
2. Factors that have led to formation of alliances between Indian and foreign pharmaceutical firms
i. Role of technological factors in alliance formation
ii. Role of economic factors in alliance formation
iii. Role of competitive advantage related aspects in alliance formation
3. Business implications of strategic alliances between Indian and foreign pharmaceutical firms
i. The major business area impacted during an alliance
ii. Impact of alliance on marketing elements
iii. Impact of alliances on the People of the firms who have formed an alliance
4. Factors that are critical for a successful alliance between Indian and foreign pharmaceutical firms
i. Critical success factors with respect to Indian context
ii. Beneficial aspects of alliances to Indian firms
iii. Negative fallouts of alliances with regards to Indian pharmaceutical industry

This study will address the above identified research gaps through both primary and secondary data evaluation. The primary data will be collected by the elements on whom the alliance has an impact, namely employees and customers.

CHAPTER 4

RESEARCH METHODOLOGY

CHAPTER 4: RESEARCH METHODOLOGY

This chapter describes the research methodology adopted in the thesis "Study of the strategic alliances between Indian and foreign pharmaceutical companies in India, with reference to the Indian pharmaceutical industry."

4.1 Research Objectives

The research objectives are derived from the gaps in literature review. The research questions are some of the key aspects to which the answers need to be sought. Both the aspects of the research are illustrated in the table below.

1. To study the factors that influence Indian pharmaceutical companies to form strategic alliances with foreign pharmaceutical firms.

2. To study the impact of the strategic alliances between Indian and foreign pharmaceutical companies on various business aspects of the Indian pharmaceutical firm.

3. To formulate strategies for Indian pharmaceutical companies to avail maximum benefit, from the alliances undertaken with foreign pharmaceutical companies.

4.2 Scope of the Research

The research study analyses the alliances that have happened between Indian and foreign pharmaceutical companies. The period under consideration is the last 5 decades that is, from 1950-2009. It traces the evolution of the Indian pharmaceutical industry over the years and also draws a comparison with the global pharmaceutical firms. The study tracks the alliances of 10 major Indian pharmaceutical companies, along with the reason for the alliance. Empirical study is conducted to understand the impact of alliances on various aspects of the business: Product, Marketing, Technology, Manufacturing and Competitive Advantage. Personal interviews of four CEOs/ MDs of Indian pharmaceutical companies , who are involved in strategic alliances with foreign pharmaceutical companies gave an framework to the various critical parameters that impact alliance formation and the areas that are impacted during an alliance.

The study does not discuss the alliances happening in other countries, especially between firms in developed countries. The study does not study each of the alliance in detail and analyze the success or failure of the alliance. It does not discuss the alliance outcomes in relation to business goal achievements, impact on turnover etc.

4.3 Research Questions

Research Questions	Data
What are the factors that influence the formation of strategic alliance between Indian and foreign pharmaceutical firms ?	Primary data
What are the major business implications of strategic alliances between Indian and foreign pharmaceutical alliances?	Primary data
What are the hindrances for strategic alliances between Indian and foreign pharmaceutical companies?	Primary data

4.4 Identification of Variables

The variables selected to answer the research questions involve:

- factors that motivate the Indian pharmaceutical companies to form alliances with foreign companies
- the impact of strategic alliance between Indian and foreign pharmaceutical companies on various aspects of the business.
- Factors that influence the success of the strategic alliances between Indian and foreign pharmaceutical companies

The factors are identified from various existing literatures.

Illustration 8 : Variables and Literature References

Factors that Motivate Indian Pharmaceutical Companies to form Alliances with Foreign Companies		
	Factors	Literature References
1	Access to global markets	*Pradhan Jaya Prakash (2007), Pradhan and Abraham (2005), Parvatiyar Atul and Gupta P. Yash (1994), Smith Sean Eric (2000)*
2	Access to new technology	*Greene William (2007), Feinberg e. Susan and Majumdar K. Sumit(2001), Chaturvedi Kalpana and Chataway Joanna (2006), Parvatiyar Atul and Gupta P. Yash (1994) , Smith Sean Eric (2000)*
3	Access to foreign distribution network	*Parvatiyar Atul and Gupta P. Yash (1994)*
4	Access to USFDA approved manufacturing facilities	*Greene William (2007), Pradhan and Abraham (2005*
5	Strengthen product portfolio	*Nerkar Atul and Roberts Peter (2004), Mueller M. Janice (2007)*
6	Acquire marketing knowhow	*Smith Sean Eric (2000)*
7	Access to highly regulated markets	*Pradhan JayaPrakash(2005), Pradhan and Abraham (2005*
8	Collaborative R&D	*R. Narula and J. H. Dunning (1998), Chaturvedi Kalpana and Chataway Joanna (2006)*
9	Overall cost minimization	*Smith Eric (2000), Pradhan Jaya Prakash (2007)*
10	Improve market positions	*Hess Jon (2005), Brian S Silverman , Joel A C Baum (2002)*
11	Exploit common assets	*Mowery C. David , Oxley E. Joanne, Silverman S. Brian (1996), Pradhan Jaya Prakash (2007)*
12	Develop financial strength	*Chaturvedi Kalpana and Chataway Joanna (2006)*
13	Establish a brand name abroad	*Pradhan Jaya Prakash (2007)*
14	Access to worldwide information on latest technology and products	*Parvatiyar Atul and Gupta P. Yash (1994)*
15	Managerial knowhow – access to superior managerial skills	*Parvatiyar Atul and Gupta P. Yash (1994)*
16	Access to superior Quality management systems	*Parvatiyar Atul and Gupta P. Yash (1994)*

Impact of the Alliance between Indian and Foreign Pharmaceutical Companies		
	Factors	Literature References
1	Launch new patented molecules	*Nerkar Atul and Roberts Peter (2004), Mueller M. Janice (2007), Kiran Ravi and Mishra Sunita (2009)*
2	Launch new generic molecules in the foreign markets	*Smith Eric (2000), Mueller M. Janice (2007), Gehl Sampath (2005)*
3	Gain access to highly regulated market	*Greene William (2007), Parvatiyar Atul and Gupta P. Yash (1994), Gehl Sampath (2005)*
4	Achieved R&D capability	*Linton Katherine Connor and Corrado Nicholas (2007), Kiran Ravi and Mishra Sunita (2009), Bower D. Jane and Sulej C. Julian (2007), Gehl Sampath (2005)*
5	Gain access to new technology	*Feinberg E. Susan and Majumdar K. Sumit(2001), Parvatiyar Atul and Gupta P. Yash (1994), Kiran Ravi and Mishra Sunita (2009)*
6	Gain capability to invest in marketing and sales promotional activities	*Chitoor Raveendra, Ray Sougata, Aulakh s. Preet, Sarkar M. B. (2008)*
7	Gain GMP compliant manufacturing capabilities	*Parvatiyar Atul and Gupta P. Yash (1994), Gehl Sampath (2005)*
8	Achieve cost minimization	*Linton Katherine Connor and Corrado Nicholas (2007)*
9	Achieve increased market share	*Pradhan and Abraham (2005), Chaturvedi Kalpana and Chataway Joanna (2006), Parvatiyar Atul and Gupta P. Yash (1994)*
10	Achieve increased profitability	*Chitoor Raveendra, Ray Sougata, Aulakh s. Preet, Sarkar M. B. (2008), Kiran Ravi and Mishra Sunita (2009), Bower D. Jane and Sulej C. Julian (2007)*
11	Exploit common assets	*Pradhan and Abraham (2005), Gehl Sampath (2005)*
12	Gain enhanced product portfolio	*Pradhan JayaPrakash (2007), Nerkar Atul and Roberts Peter (2004), Mueller M. Janice (2007)*
13	Establish a brand name abroad	*Pradhan Jaya Prakash (2007)*
14	Access to worldwide information - latest advancements in technology and products	*Parvatiyar Atul and Gupta P. Yash (1994)*
15	Enabled Managerial knowhow – access to superior management systems	*Parvatiyar Atul and Gupta P. Yash (1994)*
16	Access to superior Quality systems	*Parvatiyar Atul and Gupta P. Yash (1994)*

4.5. Research Hypotheses

A comprehensive literature review and the scheduling study which was conducted with CEOs of Indian firms who have entered into strategic alliances with foreign firms formed the base for the Hypotheses formulation.

Hypotheses

1 : RELATED TO IMPACT ON PRODUCTS

Impact of Strategic alliances between Indian and foreign pharmaceutical companies on the launch of new patented molecules.

H01: There is no significant difference in the mean value of launch of new patented molecules as an area if impact of strategic alliances between Indian and foreign pharmaceutical companies across the types of Indian pharmaceutical companies.

H02: There is no significant difference in the mean value of launch of patented molecules as an area of impact of strategic alliances between Indian an foreign pharmaceutical companies , across the types of activity undertaken by Indian pharmaceutical companies.

H03: There is no significant difference in the mean value of launch of patented molecules as an area of impact of strategic alliances between foreign pharmaceutical companies, across Indian pharmaceutical companies of differing turnover.

Impact of Strategic alliances between Indian and foreign pharmaceutical companies on the launch of generic pharmaceutical products in India.

H04: There is no significant difference in the mean value of launch of generic pharmaceutical products abroad as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies.

H05: There is no significant difference in the mean value of launch of generic pharmaceutical products abroad as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across the types of activity undertaken by Indian pharmaceutical companies.

H06: There is no significant difference in the mean value of launch of generic pharmaceutical products abroad as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of varying turnover.

Impact of Strategic Alliances between Indian and foreign pharmaceutical companies on the launch of generic pharmaceutical products abroad.

H07: There is no significant difference in the mean value of launch of new generic pharmaceutical products in the domestic market as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies on the, across the types of Indian pharmaceutical companies.

H08: There is no significant difference in the mean value of launch of new generic pharmaceutical products in the domestic market as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies across the types of activity undertaken by Indian pharmaceutical companies.

H09: There is no significant difference in the mean value of launch of new generic pharmaceutical products in the domestic market as an area of impact of strategic alliances between foreign pharmaceutical companies, across Indian pharmaceutical companies with different turnovers.

Impact of Strategic alliances with foreign pharmaceutical companies on gaining a wider product portfolio

H010: There is no significant difference in the mean value of expansion of product portfolio as an area impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies.

H011: There is no significant difference in the mean value of expansion of product portfolio as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies indulging in various activities.

H012: There is no significant difference in the mean value of expansion of product portfolio as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of varying turnover.

2: RELATED TO IMPACT ON MARKETING ASPECTS

Impact of Strategic Alliances between Indian and foreign pharmaceutical companies on gaining access to highly regulated markets abroad

H013: There is no significant difference in the mean value of gaining access to highly regulated markets abroad as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies.

H014: There is no significant difference in the mean value of gaining access to highly regulated markets abroad as an area of impact of strategic alliances between Indian and

foreign pharmaceutical companies, across Indian pharmaceutical companies undertaking different activities

H015: There is no significant difference in the mean value of gaining access to highly regulated markets abroad as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies across Indian pharmaceutical companies of different turnover

Impact of Strategic Alliances between Indian and foreign pharmaceutical companies on gaining capability to invest in sales and marketing.

H016: There is no significant difference in the mean value of gaining investment capability into sales and marketing as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies.

H017: There is no significant difference in the mean value of gaining investment capability into sales and marketing , as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical with varying business activities.

H018: There is no significant difference in the mean value of gaining investment capability into sales and marketing, as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies with varying turnover

Impact of Strategic Alliances between Indian pharmaceutical companies on gaining access into foreign distribution networks abroad.

H019: There is no significant difference in the mean value of gaining access to foreign distribution networks abroad as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies.

H020: There is no significant difference in the mean value of gaining access to foreign distribution networks abroad as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies with differing turnover

H021: There is no significant difference in the mean value of gaining access to foreign distribution networks abroad as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, Indian pharmaceutical companies undertaking different activities

3: RELATED TO IMPACT ON TECHNOLOGY

Impact of Strategic Alliances between Indian and foreign pharmaceutical companies on gaining access to new technology,

H022: There is no significant difference in the mean value of gaining technological competency as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies.

H023: There is no significant difference in the mean value of gaining technological competency as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies indulging in various activities.

H024: There is no significant difference in the mean value of gaining technological competency as an area impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of varying turnover.

Impact of Strategic Alliances between Indian and foreign pharmaceutical companies on achieving R&D capability.

H025: There is no significant difference in the mean value of achieving R&D capability, as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies

H026: There is no significant difference in the mean value of achieving R&D capability, as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies indulging in various activities.

H027: There is no significant difference in the mean value of achieving R&D capability, as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of varying turnover.

Impact of Strategic alliances between Indian and foreign pharmaceutical companies on gaining access to the latest information on technological and product related upgrades.

H028: There is no significant difference in the mean value of accessibility of Indian companies to latest technological and product related upgrades as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies on, across all types of Indian pharmaceutical companies.

H029: There is no significant difference in the mean value of accessibility of Indian companies to latest technological and product related upgrades as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of different turnover.

H030: There is no significant difference in the mean value of accessibility of Indian companies to latest technological and product related upgrades as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies with different activities.

Impact of Strategic alliances between Indian and foreign pharmaceutical companies on gaining GMP compliant manufacturing sites.

H031: There is no significant difference in the mean value of development of GMP compliant production capacities by Indian pharmaceutical companies as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies.

H032: There is no significant difference in the mean value of development of GMP compliant production capacities by Indian pharmaceutical companies as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies performing different activities.

H033: There is no significant difference in the mean value of development of GMP compliant production capacities by Indian pharmaceutical companies as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of different turnover.

4: RELATED TO IMPACT ON MANUFACTURING

Impact of Strategic Alliances between Indian pharmaceutical companies on cost optimization.

H034: There is no significant difference in the mean value of cost optimization as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies across the types of Indian pharmaceutical companies.

H035: There is no significant difference in the mean value of cost optimization as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies across the types of activity undertaken by Indian pharmaceutical companies.

H036: There is no significant difference in the mean value of cost optimization as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies across Indian pharmaceutical companies of varying turnover.

Impact of Strategic Alliances between Indian pharmaceutical companies on exploiting common assets.

H037: There is no significant difference in the mean value of achieving operational synergy as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies across the types of Indian pharmaceutical companies.

H038: There is no significant difference in the mean value of achieving operational synergy as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies across the types of activity undertaken by Indian pharmaceutical companies. .

H039: There is no significant difference in the mean value of achieving operational synergy as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies across Indian pharmaceutical companies of varying turnover.

Impact of Strategic Alliances between Indian and foreign pharmaceutical companies on gaining superior quality management skills.

H040: There is no significant difference in the mean value of quality related skills acquired by Indian pharmaceutical companies, as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies.

H041: There is no significant difference in the mean value of quality related skills acquired by Indian pharmaceutical companies, as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of different turnover.

H042: There is no significant difference in the mean value of quality related skills acquired by Indian pharmaceutical companies, as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies with different activities.

5: RELATED TO IMPACT ON COMPETITIVE ADVANTAGE

Impact of Strategic Alliance between Indian and foreign pharmaceutical companies on increased market shares,

H043: There is no significant difference in the mean values of increased market share as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies.

H044: There is no significant difference in the mean values of increased market share as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies indulging in various activities.

H045: There is no significant difference in the mean value of increased market share as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of differing turnovers.

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Impact of Strategic Alliances between Indian and foreign pharmaceutical companies on increase in overall profitability.

H046: There is no significant difference in the mean value of on enhanced profitability as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of differing company types.

H047: There is no significant difference in the mean value of on enhanced profitability as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies indulging in various activities.

H048: There is no significant difference in the mean value of on enhanced profitability as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of differing turnovers.

Impact of Strategic Alliances between Indian and foreign pharmaceutical companies on establishing new brands in the global market,

H049: There is no significant difference in the mean value of establishment of Indian pharmaceutical brand names in the global market *as an area of* impact of strategic alliances between Indian and foreign pharmaceutical companies, across the types of activities undertaken by Indian pharmaceutical companies.

H050: There is no significant difference in the mean value of establishment of Indian pharmaceutical brand names in the global market as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across the types of Indian pharmaceutical companies.

H051: There is no significant difference in the mean value of establishment of Indian pharmaceutical brand names in the global market as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of varying turnover.

Impact of Strategic alliances between Indian and foreign pharmaceutical companies on acquiring superior managerial skills.

H052: There is no significant difference in the mean values of acquisition of management skills by Indian pharmaceutical companies as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies on the, across all types of Indian pharmaceutical companies.

H053: There is no significant difference in the mean value of acquisition of management skills by Indian pharmaceutical companies as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of different turnover.

H054: There is no significant difference in the mean value of acquisition of management skills by Indian pharmaceutical companies as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across pharmaceutical companies indulging in various activities.

4.6 Research Design

The study of strategic alliances between Indian and foreign pharmaceutical companies is fairly new topic with little available literature.Hence the research design consists of clearly two stages:

- An initial exploratory stage aimed at crystallization of research questions and,
- A formal study involving statistical tools and procedures to test the hypotheses.

Objectives of the exploratory study:

The exploratory study was conducted with the following objectives in mind,

- Establish the research questions
- Establish the hypotheses

Method of exploratory study:

Here the exploratory research is qualitative in nature and was executed by:

- Secondary data analysis
- Experience survey

Secondary data analysis involved extensive literature review which includes articles and publication which were related to the study topic. Additionally annual reports of Indian companies, news paper articles, reports from business consultants like KPMG and McKinsey became sources of information which helped to crystallize the research questions.

Experience surveys which were designed to seek out important ideas and concepts on the strategic alliances between Indian and foreign pharmaceutical companies was undertaken. The participants in the exploratory surveys were the top executives of Indian pharmaceutical

companies who had undertaken alliances with foreign pharmaceutical companies. The sample size was limited to 4 participants only. The data collection was done through individual structured interviews.

This study helped understand aspects on the reasons for strategic alliances. Some suggested factors include : cost related factors , access to new markets, acquisition of technology and knowhow, quality related aspects and the need to reduce time and efforts.

The impact of strategic alliances between Indian and foreign pharmaceutical companies, according to them, was high on products, competitive aspects and marketing strategies of Indian pharmaceutical companies.

Clarity on the intent of the alliance, good communication , cultural fit and compatibility, a well oriented alliance steering committee are some of the factors that can influence the success of strategic alliances between Indian and foreign pharmaceutical companies.

Descriptive study:

The primary objective of the descriptive or formal study is to test the hypotheses and answer the posed research questions. The second objective is to establish a correlation among various variables that are responsible for the alliances between Indian and foreign pharmaceutical companies.

4.6.1 Questionnaire Development

The primary data is collected with the help of a specific questionnaire. The questionnaire is designed to gather the reasons for alliances between Indian and foreign pharmaceutical companies and understand the outcome of the alliances. The questionnaire is divided into 4 sections.

The 1st section has 15 variables. Each variable corresponds to each factor that has influenced the formation of strategic alliances between Indian and foreign pharmaceutical companies. The variables are derived from literature references.

The 2nd section has 18 variables. This is aimed at gathering data from the responding pharmaceutical firms on their experience with strategic alliances that they have undertaken with foreign pharmaceutical companies.

The 3rd section, has 6 factors which are identified as the possible hindrances in the formation of strategic alliances in the Indian context.

The 4th section aims at gathering firm specific data. The descriptive analyses of the responding firm, will contain data relating to the Type of company, type of activity of the responding company and turnover of the responding company.

Scale and Design:

The instrument is intended to be a tool for the study of strategic alliances between Indian and foreign pharmaceutical companies with the objective of understanding the factors that have contributed to the formation of alliances between Indian and foreign pharmaceutical companies. Additionally it aims at gathering firm specific experiences with respect to the outcomes of the strategic alliances.

For this study, the existing components from literature and the components suggested by the scheduling research by the industry experts were considered. Convergent and discriminant validity of the scales were verified through two rounds of scrutiny by judges and the items from the various scales were sorted under appropriate buckets. Weak and bad items from the original construct were redefined. The resulting construct was subjected to preliminary test followed by a pilot scale field test.

The Questionnaire is designed as per Likert scale, thus the level of variables are ordinal. The data scale has order but no magnitude and is a categorical data. The Non parametric tests will be used for hypotheses testing.

4.6.2.Questionnaire Administration

The sample population for this study is derived from the list of Indian pharmaceutical companies registered in recognized databases namely IDMA. The IDMA has 300 registered members and includes companies dealing with pharmaceutical manufacturing. It also includes pharmaceutical companies who are involved in contract research, research and contract manufacturing. Many of these registered pharmaceutical companies have undertaken strategic alliances with other pharmaceutical firms. The sample would consist of firms which have undergone strategic alliances with another foreign firm. The respondents will be: Top executives of pharmaceutical companies in India

Top executives here refers to the senior managers in Marketing , CEO, MD, Heads of R&D , Heads of Production, Executives from Strategy and Development and other functions who are privy to high level activities like alliances and acquisitions. The inputs from the top executives of pharmaceutical companies in India, gives a complete perspective of the strategic alliances between Indian and foreign pharmaceutical companies.

Sample frame:

The sample frame for the top executives in pharmaceutical companies of Indian origin extends to across India irrespective of the turnover, type and activity of the company. The database was acquired from the Indian Drug Manufacturer's Association (IDMA), which is a registry for Indian pharmaceutical companies.

Sampling method:

The database of firms that have undertaken strategic alliance was created. This included a number of 250 Indian companies. From this overall number companies were selected randomly to administer the questionnaire. However the representation in the survey depends upon the permission granted by the company to get included in the survey.

Sample size:

- To calculate the sample size, the following information is critical.

Precision desired	95% confidence level
Size of the interval estimate	±5
Central tendency	3
Population Dispersion	Selective

Source : Cooper and Schindler- Business Research Methods

Sample size is computed as: The appropriate sample size for a population based survey is determined by three factors:

- Expected frequency value or prevalence of variables of interest, assumed to be 50 % (p)
- Desired level of confidence, which at 95% is a standard value of 1.96 (t)
- Acceptable margin of error, which for a standard value of 0.05 is 5% (m)

Sample size (n) is computed as follows (CEO / Sr. Managers)

Precision: 95% confidence

Expected Frequency: 99% (p)

$n = \frac{t^2 \times p(1-p)}{m^2}$ $n = \frac{1.96^2 \times 0.99(1-0.99)}{0.05^2}$ **n= 15**

The questionnaire was administered to 250 companies. The total responses received was 73. Thus the overall sample size considered for this study is 73 .

4.6.3. Pilot study

In this stage a pilot study of the entire questionnaire was conducted with a small sample size comprising of 06 top executives from Indian pharmaceutical companies. The samples were selected purely on convenience.

The first aim of the pilot test was to ensure that the mechanics of questionnaire response and compilation were adequate. This was accomplished by having the respondents complete

the questionnaire and comment on the length, wording, instructions and complexity of the questionnaire.

The second aim is to establish the reliability of the scales. This was achieved by conducting a Cronbach's alpha where the reliabilities for this study were set around 0.7 and 0.8 range. During this analysis, the variances of the items and the scales were inspected and the change in Cronbach's alpha when an item would be deleted from the scale was noted. The table below illustrates the alpha values for the set of data.

Reliability coefficients of the pilot study:

Variables relating to the Reasons for strategic alliance and Impact of Strategic Alliance between Indian and foreign pharmaceutical companies

Table No. 12: Reliability Coefficients of Pilot Study

	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
Reasons for strategic alliance	.780	.784	10
Impact of strategic alliance	.737	.727	18

The alpha coefficient for the four items is .780, suggesting that the items have relatively high internal consistency.

The alpha coefficient for the four items is .737, suggesting that the items have relatively high internal consistency.

Conclusions of the Pilot Study:

The following conclusions can be drawn with respect to the results of the pilot study.

The instrument that was designed to collect data to prove the hypotheses fulfils the reliability requirements. Additionally based on the feedback of the respondents the instrument has proven to be adequate in terms of:

- Clarity of questions
- Flow
- Ease of answering

- Language
- Constructs

A univariate analyses of the responses indicates that the hypotheses can be tested with the questionnaire .

The coefficient of reliability – chronbach alpha is >0.7 indicating consistency of responses.

4.6.4. Method of Analysis and Justification

The scale of measurement for the data collected is nominal in nature, and hence non-parametric. Random sampling method was used for data collection.

Hypotheses were tested using single and multiple variables.

The variables chosen were:

- Type of pharmaceutical companies (API, Formulations, R&D, Clinical Research)
- Type of activities of the pharmaceutical companies (Manufacturing, R&D , Contract Research, Distribution)
- Turnover of the pharmaceutical companies (<100 cr, 100-300Cr, 300-500 cr, >500cr annually)

The groups are independent, that is presence of the members in one group is not dependent upon membership in another . The statistical techniques that were used are:

- Non parametric tests which assesses the population distribution
- One sample tests to understand the aspects which drive strategic alliances between Indian and foreign pharmaceutical companies
- K- sample tests to evaluate the variables for the three groups from the population
    - One way Analysis of Variance (ANOVA)
- Correlation to assess the correlation between scale variables
- Regression to predict a model fit

4.7 Limitations of the Research

The study does have certain limitations which are enumerated as follows:

- *Time span:* The research considers the strategic alliance between Indian and foreign pharmaceutical companies in the last 4 decades till 2010. Although passing references are made, alliances made in 2011 and 2012 are not considered. The trends from 2011 are not extrapolated, although this can be an interesting study as alliances are still being considered and some alliances have been successful and some have fallen apart (Pfizer and Biocon).
- *Sampling limitations:* Inadequate representations under the various categories of the pharmaceutical companies.
- *Gaps in data:* In India there is no single database which records all the alliances that have happened in the Indian pharmaceutical industry in the last few decades. The compilation was done through secondary data from journals, newspapers and articles. There are possibilities that all the alliances between companies may not have been recorded.

CHAPTER 5

DATA ANALYSIS

CHAPTER 5: DATA ANALYSIS

5.1: Overview

The first objective of the analyses is to find out the relevant reasons that influence the alliance formation between Indian and foreign pharmaceutical companies. The mean and SD are calculated to bring out the critical factors.

The second objective is to understand the impact of strategic alliances between Indian and foreign pharmaceutical companies in various business aspects. The data is analyzed and reasons categorized under three areas: Type of company; Type of activity undertaken by the company; Turnover of the company. The significance is calculated using ANOVA in SPSS. Based on the significance the hypotheses is supported or not supported.

The third objective is to understand the external and internal hindrances which impact the success of strategic alliances between Indian and foreign pharmaceutical companies. Mean and Standard deviations are calculated to ascertain the important factors.

Correlation test is done to identify the factor thereby evaluating a linear relation. The model feasibility and fit is evaluated through regression analyses.

Reliability coefficient test for final data

Table No. 13: Reliability Coefficients of Final Data

Factor	Sample size	Cronbach's Alpha	No. of Items	Outcome
Reasons for alliance	73	.755	15	High internal consistency
Business impact of strategic alliances	73	.867	18	High internal consistency
Hindrances for strategic alliances	73	.701	6	High internal consistency

Since the data is tested for consistency and proved to be consistent further analyses was conducted.

5.2 Reasons for Strategic Alliances between Indian and Foreign Pharmaceutical Companies

The reasons which have encouraged the formation of strategic alliances between Indian and foreign pharmaceutical companies can be categorized under 5 reasons:

- Product related
- Marketing and Distribution related
- Technology
- Manufacturing
- Gain Competitive advantage

5.2.1. Product Related

Product related reasons as driving factors for the formation of strategic alliances between Indian and foreign pharmaceutical companies.

Table No. 14: Test Statistics for Product Related Factors for Strategic Alliance

	No.	Mean	Std. Deviation	Min	Max
Product -Strengthen product portfolio	73	3.83	.62	2.00	5.00
Product -Establish brand and products abroad	73	3.94	.76	1.00	5.00
Product -Launch new products in domestic and foreign markets	73	3.76	.71	2.00	5.00
Product		**3.84**			

Inference : There is a strong evidence to suggest that one of the important reasons that have led to the formation of strategic alliances between Indian and foreign pharmaceutical companies, is the need to develop new products, introduce them in new markets and enhance the product portfolio basket.

5.2.2 Marketing Related

Marketing related reasons as driving factors for the formation of strategic alliances between Indian and foreign pharmaceutical companies

Table No. 15 Test Statistics for Marketing Related Factors for Strategic Alliance

	No	Mean	Std. Deviation	Min	Max
Marketing-Global emerging markets	73	3.83	.62	2.00	5.00
Marketing-Regulated markets	73	3.94	.76	1.00	5.00
Marketing-Distribution channels abroad	73	3.76	.71	2.00	5.00
Marketing		**3.84**			

Inference: There is strong evidence to indicate that marketing related factors influence the formation of strategic alliances between Indian and foreign pharmaceutical companies. Entry to new global emerging markets, entry into regulated markets, access to new distribution channels abroad are some of the critical factors that drive alliances.

5.2.3 Technology related

Technology related reasons as driving factors for the formation of strategic alliances between Indian and foreign pharmaceutical companies

Table No. 16: Test Statistics for Technology Related Factors for Strategic Alliance

	No.	Mean	Std. Deviation	Min	Maxi
Technology-Access new technology	73	3.32	.65	1.00	4.00
Technology-Collaborative R&D	73	3.30	.90	1.00	5.00
Technology-USFDA approvals	73	3.17	.93	1.00	5.00
Technology		**3.26**			

Inference: There is strong evidence to indicate that technology is a strong motivator for the formation of strategic alliances between Indian and foreign pharmaceutical countries. Access to technology and opportunity to undertake collaborative researches are two strong reasons under the technology related features. In addition gaining knowledge about GMP and USFDA approved facilities and the access to new technological advancements are

considered to be strong motivators for the formation of strategic alliances between Indian and foreign pharmaceutical companies.

5.2.4 Manufacturing Related

Manufacturing related reasons as driving factors for the formation of strategic alliances between Indian and foreign pharmaceutical companies.

Table No. 17: Test Statistics for Manufacturing Related Factors for Strategic Alliance

	No.	Mean	Std. Deviation	Min	Max
Manufacturing-Cost minimization	73	2.92	.91	1.00	5.00
Manufacturing-Common assets	73	2.86	.92	1.00	5.00
Manufacturing-Quality management	73	3.29	.68	1.00	5.00
Manufacturing		**3.03**			

Inference: There is strong evidence to indicate that manufacturing related factors influence the formation of strategic alliances between Indian and foreign pharmaceutical countries. Minimizing manufacturing costs, achieving operational synergy by utilizing common assets and attaining quality management systems are some of the critical factors that are considered to be the reasons that drive strategic alliances between Indian and foreign pharmaceutical companies.

5.2.5 Competitive Advantage Related

Competitive advantage as driving factors for the formation of strategic alliances between Indian and foreign pharmaceutical companies

Table No. 18: Test Statistics for Competitive Advantage Related Factors for Strategic Alliance

	No.	Mean	Std. Deviation	Minimum	Maximum
Competitive Advantage-Market position	73	3.92	.72	1.00	5.00
Competitive Advantage-Financial power	73	3.99	.69	2.00	5.00
Competitive Advantage-Image	73	4.04	.72	1.00	5.00
Competitive Advantage		**3.97**			

Inference: There is significant evidence to indicate that gaining competitive advantage is one of the key drivers that encourage the formation of strategic alliances between Indian and foreign companies. Gaining competitive advantage includes gaining market positions, achieving financial power and enhancing the image of the organizations through various alliances and collaborations, thereby gaining an edge over competition.

5.3 Impact of Strategic Alliances between Indian and Foreign Pharmaceutical Companies on Products

Description of the groups:

The sample can be categorized into 3 different groups based on:

- Type of company
- Type of activity undertaken by the company
- Turnover of the company

Type of company:

The 73 respondents are grouped under the various heads based on the primary activity of the company. 40% (29) of the respondents are from API manufacturing companies. 15% (11) of the respondents are from the Formulations category. 34% (25) of the respondents are from companies who consider being of both API and Formulations category. 4% (3) of the respondents are from the Clinical Research type of companies. 7% (5) of the respondents are from the R&D type of companies.

Type of activity undertaken:

The 73 respondents are grouped under the various heads based on the key activities undertaken by the company. 44.5% (34) of the respondents are manufacturing companies who undertake manufacturing activities. 6.8% (05) of the respondents are R&D companies whose core activity is R&D. 32.8% (24) of the respondents are from companies who started off as manufacturing companies but today are also giving equal importance to R&D related activities. 10.9% (08) of the respondents are from the companies whose core activity is

Contract manufacturing. 2.7% (02) of the respondents are from the companies whose core activity is Distribution.

Turnover of the company:

The 73 respondents are grouped under the various heads based on the key activities undertaken by the company. 21.9% (16) of the respondents from pharmaceutical companies with an annual turnover <100 Crores annually. 10.9% (08) of the respondents are from pharmaceutical companies whose turnover is between 100 and 300 crores annually. 24.8% (18) of the respondents are from pharmaceutical companies whose turnover is between 301 and 500 crores annually. 42.4% (31) of the respondents are from pharmaceutical companies whose turnover exceeds 500 crores annually.

Analytical test:

Assumptions for ANOVA

- The population sample must be normal
- The observations must be independent in each sample
- There is homogeneity of variances

The one-way analysis of variance (ANOVA) is used to determine whether there are significant differences between the means of three or more independent (unrelated) groups. This test helps in testing the Null Hypotheses.

The Levene's test result indicates the homogeneity of variances. If the Levene's test result is statistically significant with a $p <= .05$, then it is interpreted as the data does not show homogeneity of variance. If the Levene's statistics is not significant ($p>0.05$), then the assumption is that the data demonstrates homogeneity of variance.

5.3.1 Strategic Alliances and Launch of Patented Molecules

5.3.1. a. Strategic Alliances and launch of patented molecules – all types of pharmaceutical companies

H01: There is no significant difference in the mean value of launch of new patented molecules as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies across the types of Indian pharmaceutical companies

Table No. 19a: *Test Statistics for Strategic Alliances and Launch of Patented Molecules – All types of Indian pharmaceutical companies*

Company Type Products-New patents	No.	Mean	Std. Deviation	F	Sig.
API	29	3.14	.79	**2.367**	**.061**
Formulations	11	3.09	.83		
API & Formulations	25	3.56	.87		
Clinical Research	3	2.67	1.15		
R&D	5	4.00	.71		
Total	**73**	**3.32**	**.86**		

Leven's statistic	df1	df2	Sig
.556	4	68	.695

The Levene's statistic is not significant ($p > 0.05$) 0.695 indicating the homogeneity of variances. Level of significance is 0.061 (p=0.061). There is no statistically significant difference between groups as determined by one-way ANOVA ($F(4, 68) = 2.367$, $p = 0.061$).

Inference: The null hypothesis is supported.

5.3.1.b. Strategic Alliances and launch of patented molecules – across different activities of Pharmaceutical companies

H02: There is no significant difference in the mean value of launch of patented molecules as an area of impact of strategic alliances between Indian an foreign pharmaceutical companies, across the types of activity undertaken by Indian pharmaceutical companies

Table No.19b: *Test Statistics for Strategic Alliances and Launch of Patented Molecules – across different activities of Indian pharmaceutical companies*

Company Activity Products-New patents	N	Mean	Std. Deviation	F	Sig.
Manufacturing	34	3.24	.69	**4.744**	**.002**
R&D	5	3.60	1.14		
Manufacturing / R&D	24	3.67	.82		
Contract Manufacturing	8	2.87	.83		
Distribution	2	1.50	.70		
Total	73	3.31	.86		

Levene Statistic	df1	df2	Sig.
.524	4	68	.718

The Levene's statistic is not significant (p >0.05) 0.718 indicating the homogeneity of variances. There is statistically significant difference between groups as determined by one-way ANOVA (F (4, 68) = 4.744, p = 0.002). A Tukey post-hoc HSD test indicated that the mean score for the impact of alliances on launching new patented products by the Indian pharmaceutical companies undertaking strategic alliances with foreign pharmaceutical companies is significant in three instances:

Indian pharmaceutical companies undertaking distribution activities and companies undertaking manufacturing (Mean difference, 1.735 and p, 0.027), Indian pharmaceutical companies undertaking distribution activities and companies involved in R&D (Mean difference, 2.100 and p, 0.018) and Indian pharmaceutical companies undertaking distribution activities and companies with both manufacturing and R&D companies (Mean difference, 2.1666 and p, 0.003).

***Inference*: The** null hypotheses is not supported.

5.3.1.c Strategic Alliances and launch of patented molecules – across turnovers of Indian pharmaceutical companies

H03: There is no significant difference in the mean value of launch of patented molecules as an area of impact of strategic alliances between foreign pharmaceutical companies, across Indian pharmaceutical companies of differing turnover

Table No. 19c: *Test Statistics for Strategic Alliances and Launch of Patented Molecules – across turnovers of Indian pharmaceutical companies*

Turnover Products-New patents	N	Mean	Std. Deviation	F	Sig.
< 100 Cr.	16	2.75	1.064	**4.597**	**.005**
100 – 300 Cr.	8	3.00	.75		
301- 500 Cr.	18	3.44	.51		
>500 Cr.	31	3.61	.80		
Total	73	3.31	.86		

Levene Statistic	df1	df2	Sig.
2.284	3	69	.087

The Levene's statistic is not significant (p >0.05) 0.087 indicating the homogeneity of variances.There is statistically significant difference between groups as determined by one-way ANOVA (F (3,69)=4.597, p =0.005). A Tukey post- hoc test revealed that mean difference is significant at 0.005 level for companies with turnovers <100 cr. and >500 cr (Mean difference, 0.8629 and p, 0.005).

***Inference*: The null hypotheses is not supported.**

5.3.2. Strategic Alliances and Launch of Generic Products Abroad

5.3.2. a. Strategic Alliances and launch of generic products abroad – types of pharmaceutical companies

H04: There is no significant difference in the mean value of launch of generic pharmaceutical products abroad as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies.

Table No. 20a*: Test Statistics for Strategic Alliances and Launch of generic products abroad – all types of Indian pharmaceutical companies*

Company Type Products-New generics abroad	N	Mean	Std. Deviation	F	Sig.
API	29	3.55	.90	**2.016**	**.102**
Formulations	11	3.36	1.12		
API & Formulations	25	3.96	.78		
Clinical Research	3	2.66	1.15		
R&D	5	3.60	.54		
Total	73	3.63	.92		

Levene Statistic	df1	df2	Sig.
1.101	4	68	.363

The Levene's statistic is not significant (p > 0.05) 0.363 indicating the homogeneity of variances. Level of significance is 0.102 (p=0.102) which is above 0.05 hence there is no statistically significant difference. There is no statistically significant difference between groups as determined by one-way ANOVA (F (4, 68) =2.016, p = 0.102)).

Inference: The null hypotheses is supported.

5.3.2.b. Strategic Alliances and launch of generic products abroad – activities of pharmaceutical companies

H05: There is no significant difference in the mean value of launch of generic pharmaceutical products abroad as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies indulging in various activities.

Table No. 20b: *Test Statistics for Strategic Alliances and Launch of generic products abroad – across different activities of Indian pharmaceutical companies*

Company Activities Products-New generics abroad	N	Mean	Std. Deviation	F	Sig.
Manufacturing	34	3.44	.990	**3.618**	**.010**
R&D	5	3.20	.836		
Manufacturing & R&D	24	4.12	.679		
Contract Manufacturing	8	3.50	.755		
Distribution	2	2.50	.707		
Total	73	3.63	.920		

Levene Statistic	df1	df2	Sig.
1.404	4	68	.242

The Levene's statistic is not significant (p >0.05) 0.242 indicating the homogeneity of variances. Level of significance is 0.010 (p= 0.010) which is below 0.05 hence there is a

statistically significant difference. There is a statistically significant difference between groups as determined by one-way ANOVA (F (4, 68) = 3.618, p = 0.010).

A Tukey post- hoc test revealed that mean difference (0.68382) is significant at 0.031 level for Indian Pharmaceutical companies with only Manufacturing as their core activities and companies with both Manufacturing and R&D as their core activities.

Inference: The null hypothesis is not supported.

5.3.2.c. Strategic Alliances and launch of generic products abroad – across turnovers of pharmaceutical companies

H06: There is no significant difference in the mean value of launch of generic pharmaceutical products abroad as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of varying turnover

Table No. 20c *: Test Statistics for Strategic Alliances and Launch of generic products abroad – across turnover of Indian pharmaceutical companies*

Turnover / Products-New generics abroad	N	Mean	Std. Deviation	F	Sig.
< 100 Cr.	16	2.93	1.12	**6.125**	**.001**
100 – 300 Cr.	8	3.50	.92		
301- 500 Cr.	18	3.61	.69		
>500 Cr.	31	4.03	.70		
Total	73	3.63	.92		

Levene Statistic	df1	df2	Sig.
2.138	3	69	.103

The Levene's statistic is not significant (p >0.05) 0.103 indicating the homogeneity of variances.Level of significance is 0.001 (p=0.001) which is below 0.05 hence there is a statistically significant difference. There is a statistically significant difference between groups as determined by one-way ANOVA (F (3, 69) =6.125, p =0.001).

A Tukey post- hoc test revealed that mean difference (1.09476) is significant at 0.000 level for Indian pharmaceutical companies with turnovers <100 cr. and >500 cr. (Mean difference, 1.09476 and p,0.000).

Inference: The results indicate that the null hypothesis is not supported.

5.3.3. Strategic Alliances and Launch of Generic Products in Domestic Market

5.3.3.a. Strategic Alliances and launch of generic products in domestic market – across all types pharmaceutical companies

H07: There is no significant difference in the mean value of launch of new generic pharmaceutical products in the domestic market as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across the types of Indian pharmaceutical companies..

Table No. 21a : *Test Statistics for Strategic Alliances and Launch of Generic Products in Domestic Market – all types of pharmaceutical companies*

Company Type Products-New generics domestic	N	Mean	Std. Deviation	F	Sig.
API	29	3.34	.66	**1.537**	**.201**
Formulations	11	3.36	.92		
API & Formulations	25	3.72	.84		
Clinical Research	3	2.66	1.15		
R&D	5	3.60	1.14		
Total	73	3.46	.83		

Levene Statistic	df1	df2	Sig.
.748	4	68	.563

The Levene's statistic is not significant (p >0.05) 0.563 indicating the homogeneity of variances. Level of significance is 0.201 (p=0.201) which is above 0.05 hence there is no statistically significant difference. There is no statistically significant difference between groups as determined by one-way ANOVA (F (4, 68) =1.537, p =0.201)).

Inference: The null hypothesis is supported.

5.3.3.b. Strategic Alliances and launch of generic products in domestic market- by pharmaceutical companies across all activities

H08: There is no significant difference in the mean value of launch of new generic pharmaceutical products in the domestic market as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies across the types of activity undertaken by Indian pharmaceutical companies.

***Table No. 21 b**: Test statistics for Strategic Alliances and Launch of Generic Products in Domestic Market – across different activities pharmaceutical companies*

Company Activity Products-New generics domestic	N	Mean	Std. Deviation	F	Sig.
Manufacturing	34	3.35	.77	**2.427**	**.056**
R&D	5	3.20	1.30		
Manufacturing / R&D	24	3.83	.76		
Contract Manufacturing	8	3.25	.70		
Distribution	2	2.50	.70		
Total	73	3.46	.83		

Levene Statistic	df1	df2	Sig.
1.273	4	68	.289

The Levene's statistic is not significant (p >0.05) 0.289 indicating the homogeneity of variances. Level of significance is 0.056 (p=0.056) which is above 0.05 hence there is no statistically significant difference. There is no statistically significant difference between groups as determined by one-way ANOVA (F (4, 68) =2.427, p =0.056).

Inference: The null hypothesis is supported.

5.3.3.c. Strategic Alliances and launch of generic products in domestic market–pharmaceutical companies of different turnover.

H09: There is no significant difference in the mean value of launch of new generic pharmaceutical products in the domestic market as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies with different turnovers.

Table No. 21 c: *Test Statistics for Strategic Alliances and Launch of Generic Products in Domestic Market – across turnovers of Indian pharmaceutical companies*

Turnover Products-New generics domestic	N	Mean	Std. Deviation	F	Sig.
< 100 Cr.	16	3.00	.96	**2.776**	**.048**
100 – 300 Cr.	8	3.37	.74		
301- 500 Cr.	18	3.50	.70		
>500 Cr.	31	3.70	.78		
Total	73	3.46	.83		

Levene Statistic	df1	df2	Sig.
.343	3	69	.795

The Levene's statistic is not significant (p >0.05) 0.795 indicating the homogeneity of variances.

Level of significance is 0.048 (p=0.048) which is below 0.05 hence there is a statistically significant difference. There is a statistically significant difference between groups as determined by one-way ANOVA (F (3, 69) = 2.776p =0.048). A Tukey post- hoc test revealed that mean difference is significant between Indian pharmaceutical companies with turnover <100 cr. and Indian pharmaceutical companies with turnover between > 500 cr. (mean difference 0.70968 and p= 0.028)

Inference : The null hypothesis is not supported.

5.3.4. Strategic Alliances and Enhanced Product Portfolio

5.3.4.a. Strategic Alliances and enhanced product portfolio – across all types pharmaceutical companies

H010: There is no significant difference in the mean value of expansion of product portfolio as an area impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies.

Table No.22 a: *Test Statistics for Strategic Alliances and Enhanced Product Portfolio – all types pharmaceutical companies*

Company Type				F	Sig.
Products-Wide portfolio	N	Mean	Std. Deviation		
API	29	3.68	.54	**1.680**	**.165**
Formulations	11	3.72	.46		
API & Formulations	25	4.08	.75		
Clinical Research	3	3.66	1.52		
R&D	5	4.20	.44		
Total	73	3.86	.67		

Levene Statistic	df1	df2	Sig.
3.072	4	68	.022

The Levene's statistic is significant (p >0.05) 3.072, however literature indicates ANOVA can be done on the data. Level of significance is 0.165 (p=0.165) which is above 0.05 hence there is no statistically significant difference. There is no statistically significant difference between groups as determined by one-way ANOVA (F (4,68)=1.680,p =0.165).

Inference: The null hypothesis is supported.

5.3.4.b. Strategic Alliances and enhanced product portfolio – all activities of pharmaceutical companies

H011: There is no significant difference in the mean value of expansion of product portfolio as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies indulging in various activities.

Table No.22b: *Test Statistics for Strategic Alliances and Enhanced Product Portfolio – across different activities of pharmaceutical companies*

Company Activity				F	Sig.
Products-Wide portfolio	N	Mean	Std. Deviation		
Manufacturing	34	3.58	.55	**4.117**	**.005**
R&D	5	4.40	.54		
Manufacturing / R&D	24	4.16	.70		
Contract Manufacturing	8	3.75	.70		
Distribution	2	4.00	.00		
Total	73	3.86	.67		

Levene Statistic	df1	df2	Sig.
1.405	4	68	.242

The Levene's statistic is not significant (p >0.05) 0.242 indicating the homogeneity of variances Level of significance is 0.005 (p=0.005) which is below 0.05 hence there is a statistically significant difference. There is a statistically significant difference between groups as determined by one-way ANOVA (F (4,68)=4.117,p =0.005). A Tukey post- hoc test revealed that mean difference is significant at 0.007 level for Indian pharmaceutical companies whose core activity includes only manufacturing versus Indian pharmaceutical companies whose core activities include manufacturing and R&D (Mean difference, 0.57843 and p,0.007).

Inference: The null hypotheses is not supported.

5.3.4.c. Strategic Alliances and enhanced product portfolio – turnover pharmaceutical companies

H012: There is no significant difference in the mean value of expansion of product portfolio as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of varying turnover.

Table No. 22c: *Test Statistics for Strategic Alliances and Enhanced Product Portfolio —across turnovers of Indian pharmaceutical companies.*

Turnover Products-Wide portfolio	N	Mean	Std. Deviation	F	Sig.
< 100 Cr.	16	3.81	.54	**2.084**	**.110**
100 – 300 Cr.	8	3.50	.75		
301- 500 Cr.	18	3.72	.66		
>500 Cr.	31	4.06	.67		
Total	73	3.86	.67		

Levene Statistic	df1	df2	Sig.
.506	3	69	.679

The Levene's statistic is not significant (p >0.05) 0.679 indicating the homogeneity of variances. Level of significance is 0.110 (p=0.110) which is above 0.05 hence there is no statistically significant difference. There is no statistically significant difference between groups as determined by one-way ANOVA (F (3, 69) =2.084,p =0.110)).

Inference: **The null hypothesis is supported.**

5.4: Impact of Strategic Alliances between Indian and Foreign Pharmaceutical Companies on Marketing

5.4.1. Strategic Alliances and Access to Regulated Markets

5.4.1.a. Strategic alliances and access to regulated markets- type of pharmaceutical companies

H013: There is no significant difference in the mean value of access to highly regulated markets abroad as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies , across all types of Indian pharmaceutical companies

Table No. 23 a: *Test statistics for Strategic Alliances and Access to Regulated Markets – all type of pharmaceutical companies*

Company Type				F	Sig.
Marketing-Regulated market	N	Mean	Std. Deviation		
API	29	3.62	.62	**0.553**	**.697**
Formulations	11	3.54	.68		
API & Formulations	25	3.84	.68		
Clinical Research	3	3.66	.57		
R&D	5	3.80	.83		
Total	73	3.69	.66		

Levene Statistic	df1	df2	Sig.
.289	4	68	.884

The Levene's statistic is not significant (p >0.05) 0.884 indicating the homogeneity of variances Level of significance is 0.697 (p=0.697) which is above 0.05 hence there is no statistically significant difference. There is no statistically significant difference between groups as determined by one-way ANOVA (F (4, 68) =0.553, p =0.697)).

Inference: The null hypothesis is supported.

5.4.1.b. Strategic alliances and access to regulated markets- activities of pharmaceutical companies

H014: There is no significant difference in the mean value of access to highly regulated markets abroad as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies undertaking different activities.

Table No.23 b: *Test statistics for Strategic Alliances and Access to Regulated Markets –across different activities of pharmaceutical companies*

Company Activity Marketing-Regulated market	N	Mean	Std. Deviation	F	Sig.
Manufacturing	34	3.47	.66	**2.060**	**.096**
R&D	5	3.80	.83		
Manufacturing / R&D	24	3.91	.65		
Contract Manufacturing	8	3.87	.35		
Distribution	2	4.00	.00		
Total	73	3.69	.66		

Levene Statistic	df1	df2	Sig.
2.887	4	68	.029

The Levene's statistic is not significant (p >0.05) 2.887 indicating the homogeneity of variancesLevel of significance is 0.096 (p=0.096) which is above 0.05 hence there is no statistically significant difference. There is no statistically significant difference between groups as determined by one-way ANOVA (F (4, 68) =0.2.060, p =0.096).

Inference: The null hypothesis is not supported.

5.4.1.c. Strategic alliances and access to regulated markets- turnover of pharmaceutical companies

H015: There is no significant difference in the mean value of access to highly regulated markets abroad as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies across Indian pharmaceutical companies of different turnover.

Table No. 23c: *Test statistics for Strategic Alliances and Access to Regulated Markets –across turnovers of Indian pharmaceutical companies*

Turnover Marketing-Regulated market	N	Mean	Std. Deviation	F	Sig.
< 100 Cr.	16	3.43	.62	**1.628**	**.191**
100 – 300 Cr.	8	3.62	.51		
301- 500 Cr.	18	3.66	.68		
>500 Cr.	31	3.87	.67		
Total	73	3.69	.66		

Levene Statistic	df1	df2	Sig.
.393	3	69	.758

The Levene's statistic is not significant (p >0.05) 0.393 indicating the homogeneity of variances Level of significance is 0.191 (p=0.191) which is above 0.05 hence there is no statistically significant difference. There is no statistically significant difference between groups as determined by one-way ANOVA (F (3, 69) =1.628, p =0.191).

Inference: The null hypothesis is not supported.

5.4.2. Strategic Alliances and Investment in Sales and Marketing

5.4.2.a Strategic alliances and investment in sales and marketing- across all types of pharmaceutical companies

H016: There is no significant difference in the mean value gaining investment capability into sales and marketing as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies.

Table No. 24a: *Test Statistics for Strategic Alliances and Investment in Sales and Marketing - all types of pharmaceutical companies*

Company Type: Marketing-Investment capability	N	Mean	Std. Deviation	F	Sig.
API	29	3.55	.57	**6.190**	**.000**
Formulations	11	3.27	.46		
API & Formulations	25	4.20	.76		
Clinical Research	3	4.33	.57		
R&D	5	4.20	.83		
Total	73	3.80	.73		

Levene Statistic	df1	df2	Sig.
1.544	4	68	.199

The Levene's statistic is not significant (p >0.05) 0.199 indicating the homogeneity of variances Level of significance is 0.000 (p=0.000) which is below0.05 hence there is a statistically significant difference. There is statistically significant difference between groups as determined by one-way ANOVA (F (4,68)=6.190 ,p =0.000).

A Tukey post- hoc test revealed that mean difference is significant in two instances :between Indian API companies and Indian pharmaceutical companies which are

both API and Formulations type (mean difference 0.648 and p= 0.005) and Indian Formulation companies and Indian pharmaceutical companies which are of both API and formulations type (mean difference 0.927 and p=0.002)

Inference : The null hypothesis is not supported.

5.4.2. b. Strategic alliances and investment in sales and marketing- across all activities pharmaceutical companies

H017: There is no significant difference in the mean value of gaining investment capability into sales and marketing, as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical with varying business activities.

Table No. 24 b: *Test Statistics for Strategic Alliances and Investment in Sales and Marketing - across different activities pharmaceutical companies*

Company Activity Marketing-Investment capability	N	Mean	Std. Deviation	F	Sig.
Manufacturing	34	3.35	.48	**11.233**	**.000**
R&D	5	4.40	.54		
Manufacturing / R&D	24	4.33	.70		
Contract Manufacturing	8	3.87	.64		
Distribution	2	3.50	.70		
Total	73	3.80	.73		

Levene Statistic	df1	df2	Sig
1.489	4	68	.215

The Levene's statistic is not significant (p >0.05) 0.215 indicating the homogeneity of variances Level of significance is 0.000 (p=0.000) which is below0.05 hence there is a statistically significant difference. There is statistically significant difference between groups as determined by one-way ANOVA (F (4,68)=11.233 ,p =0.000).

A Tukey post- hoc test revealed that mean difference is significant in two instances :between Indian pharmaceutical companies with manufacturing as their core activity and Indian pharmaceutical companies with R&D as their core activity(mean difference 1.04 and p= 0.004) and, between Indian pharmaceutical companies with manufacturing as their

core activity and companies with both manufacturing and R&D activities (mean difference 0.9803 and p=0.000).

Inference: The null hypothesis is not supported

5.4.2. c. Strategic alliances and investment in sales and marketing- across all turnovers pharmaceutical companies

H018: There is no significant difference in the mean value of gaining investment capability into sales and marketing, as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies with varying turnover.

Table No. 24 c: *Test Statistics for Strategic Alliances and Investment in Sales and Marketing - across turnovers of Indian pharmaceutical companies*

Turnover Marketing-Investment capability	N	Mean	Std. Deviation	F	Sig.
< 100 Cr.	16	3.50	.63	**6.177**	**.001**
100 – 300 Cr.	8	3.37	.74		
301- 500 Cr.	18	3.61	.60		
>500 Cr.	31	4.19	.70		
Total	73	3.80	.73		

Levene Statistic	df1	df2	Sig.
.028	3	69	.994

The Levene's statistic is not significant (p >0.05) 0.994 indicating the homogeneity of variances Level of significance is 0.001 (p=0.001) which is below 0.05 hence there is a statistically significant difference. There is statistically significant difference between groups as determined by one-way ANOVA (F (3,69)=6.177 , p =0.001).

. A Tukey post- hoc test revealed that mean difference is significant in three instances between pharmaceutical companies with manufacturing with an annual turnover <100 cr. and >500 cr. (mean difference 0.693 and p= 0.007), between pharmaceutical companies with manufacturing with an annual turnover between 100 and 300cr . and >500 cr. (mean difference 0.818 and p= 0.015) and between pharmaceutical companies with manufacturing

with an annual turnover between 301cr and 500cr. and >500 cr. (mean difference 0.582 and p= 0.023).

Inference: The null hypothesis is not supported

5.4.3. Strategic Alliances and Access to Emerging International Markets

5.4.3. a. Strategic alliances and access to emerging international markets- all types of Indian pharmaceutical companies

H019. There is no significant difference in the mean value of gaining access to foreign distribution networks abroad as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies.

Table No. 25a: *Test Statistics for Strategic Alliances and Access to Emerging International Markets - all types of pharmaceutical companies*

Company Type Marketing-Foreign distribution	N	Mean	Std. Deviation	F	Sig.
API	29	3.65	.66	**5.347**	**.001**
Formulations	11	3.00	.77		
API & Formulations	25	4.12	.66		
Clinical Research	3	4.00	.00		
R&D	5	3.80	.83		
Total	73	3.73	.76		

Levene Statistic	df1	df2	Sig.
1.304	4	68	.277

The Levene's statistic is not significant (p >0.05) 0.277 indicating the homogeneity of variances Level of significance is 0.001 (p=0.001) which is below 0.05 hence there is a statistically significant difference. There is statistically significant difference between groups as determined by one-way ANOVA (F (4,68)=5.347 , p =0.001).

A Tukey post- hoc test revealed that mean difference is significant between Indian pharmaceutical formulations companies and Indian pharmaceutical companies who are identified as both formulations and API type of companies (mean difference 1.12 and p= 0.000)

Inference: The null hypothesis is not supported

5.4.3. b. Strategic alliances and access to emerging international markets- all turnover Indian pharmaceutical companies

H020: There is no significant difference in the mean value of gaining access to foreign distribution networks abroad as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies with differing turnover.

***Table No.25b**: Test Statistics for Strategic Alliances and Access to Emerging International Markets -across turnovers of Indian pharmaceutical companies*

Turnover Marketing-Foreign distribution	N	Mean	Std. Deviation	F	Sig.
< 100 Cr.	16	3.56	.89	**3.732**	**.015**
100 – 300 Cr.	8	3.37	.74		
301- 500 Cr.	18	3.50	.70		
>500 Cr.	31	4.06	.62		
Total	73	3.73	.76		

Levene Statistic	df1	df2	Sig.
2.298	3	69	.085

The Levene's statistic is not significant (p >0.05) 0.085 indicating the homogeneity of variances. Level of significance is 0.015 (p=0.015) which is below0.05 hence there is a statistically significant difference. There is statistically significant difference between groups as determined by one-way ANOVA (F (3,69)= 3.732, p =0.015)).

A Tukey post- hoc test revealed that mean difference is significant Between Indian pharmaceutical companies with an annual turnover between 301 and 500 cr , and Indian pharmaceutical companies with turnover >500 cr. (mean difference 0.564 and p= 0.050).

Inference:The null hypothesis is not supported

5.4.3. c. Strategic alliances and access to emerging international markets- all activities Indian pharmaceutical companies

H021: There is no significant difference in the mean value of gaining access to foreign distribution networks abroad as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, Indian pharmaceutical companies undertaking different activities.

***Table No.25c**: Test Statistics for Strategic Alliances and Access to Emerging International Markets - across different activities of Indian pharmaceutical companies*

Company Activity Marketing-Foreign distribution	N	Mean	Std. Deviation	F	Sig.
Manufacturing	34	3.32	.72	6.713	.000
R&D	5	4.00	.70		
Manufacturing / R&D	24	4.16	.63		
Contract Manufacturing	8	3.87	.35		
Distribution	2	4.50	.70		
Total	73	3.73	.76		

Levene Statistic	df1	df2	Sig.
2.431	4	68	.056

The Levene's statistic is not significant (p >0.05) 0.056 indicating the homogeneity of variances . Level of significance is 0.000 (p=0.000) which is below 0.05 hence there is a statistically significant difference. There is statistically significant difference between groups as determined by one-way ANOVA (F (4,68)= 6.713, p =0.000).

A Tukey post- hoc test revealed that mean difference is significant between Indian pharmaceutical companies with manufacturing as their core activity and Indian pharmaceutical companies with both manufacturing and R&D as their core activity (mean difference 0.8431 and p= 0.000).

Inference: The null hypothesis is not supported

5.5: Impact of Strategic Alliances between Indian and Foreign Pharmaceutical Companies on Technology

5.5.1. Strategic Alliances and Access to New Technology

5.5.1 a. Strategic alliances and access to new technology – company type

H022: There is no significant difference in the mean value of gaining technological competency as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies.

Table No. 26a : *Test Statistics for Strategic Alliances and Access to New Technology - all types of pharmaceutical companies*

Company Type Technology-New technology	N	Mean	Std. Deviation	F	Sig.
API	29	3.24	.83	**.562**	**.691**
Formulations	11	3.18	.60		
API & Formulations	25	3.52	1.04		
Clinical Research	3	3.66	.57		
R&D	5	3.40	.54		
Total	73	3.35	.85		

Levene Statistic	df1	df2	Sig.
1.489	4	68	.215

The Levene's statistic is negative (p >0.05) 0.215 indicating the homogeneity of variances. Level of significance is 0.691 (p=0.691) which is above 0.05 hence there is no statistically significant difference. There is no statistically significant difference between groups as determined by one-way ANOVA (F (4, 68)= 0.562 , p =0.691).

Inference: The null hypothesis is supported

5.5.1 b . Strategic alliances and access to new technology – type of activity

H023: There is no significant difference in the mean value of gaining technological competency as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies indulging in various activities.

Table No. 26b : *Test Statistics for Strategic Alliances and Access to New Technology – across different activities of Indian pharmaceutical companies*

Company Activity Technology-New technology	N	Mean	Std. Deviation	F	Sig.
Manufacturing	34	3.26	.75	**1.799**	**.139**
R&D	5	3.40	.54		
Manufacturing / R&D	24	3.50	1.06		
Contract Manufacturing	8	3.62	.51		
Distribution	2	2.00	.00		
Total	73	3.35	.85		

Levene Statistic	df1	df2	Sig.
2.365	4	68	.061

The Levene's statistic is not significant (p >0.05) 0.061 indicating the homogeneity of variances .Level of significance is 0.139 (p=0.139) which is above 0.05 hence there is no statistically significant difference. There is no statistically significant difference between groups as determined by one-way ANOVA (F (4, 68)= 1.799 , p =0.139).

Inference: The null hypothesis is supported

5.5.1 c . Strategic alliances and access to new technology – turnover

H024: There is no significant difference in the mean value of gaining technological competency as an area impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of varying turnover.

Table No. 26c : *Test Statistics for Strategic Alliances and Access to New Technology – across turnovers of Indian pharmaceutical companies*

Turnover Technology-New technology	N	Mean	Std. Deviation	F	Sig.
< 100 Cr.	16	3.12	.71	**1.242**	**.301**
100 – 300 Cr.	8	3.75	.46		
301- 500 Cr.	18	3.22	.80		
>500 Cr.	31	3.45	.99		
Total	73	3.35	.85		

Levene Statistic	df1	df2	Sig.
1.895	3	69	.139

The Levene's statistic is not significant (p >0.05) 0.139 indicating the homogeneity of variances. Level of significance is 0.301 (p=0.301) which is above 0.05 hence there is no statistically significant difference. There is statistically significant difference between groups as determined by one-way ANOVA (F (3,69)= 1.242 , p =0.301).

Inference : The null hypothesis is supported

5.5.2. Strategic Alliances and Achieving R&D Capability

5.5.2. a. Strategic alliances and achieving R&D capability – types of company

H025: There is no significant difference in the mean value of achieving R&D capability, as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies

Table No. 27a : Test Statistics for Strategic Alliances and Achieving R&D Capability - all types of pharmaceutical companies

Company Type Technology-R&D capability	N	Mean	Std. Deviation	F	Sig.
API	29	2.79	.94	**2.674**	**.039**
Formulations	11	2.63	1.12		
API & Formulations	25	3.52	1.08		
Clinical Research	3	3.66	1.15		
R&D	5	3.40	.54		
Total	73	3.09	1.05		

Levene Statistic	df1	df2	Sig.
.756	4	68	.557

The Levene's statistic is not significant (p >0.05) 0.557 indicating the homogeneity of variances. Level of significance is 0.039 (p=0.039) which is below 0.05 hence there is a

statistically significant difference. There is statistically significant difference between groups as determined by one-way ANOVA (F (4,68)= 2.674 , p =0.039).

A Tukey post- hoc test revealed that mean difference is not significant between different groups of pharmaceutical companies, which are categorized on the basis of the core company type.

Inference: The null hypothesis is not supported

5.5.2. b. Strategic alliances and achieving R&D capability –activities of company

H026: There is no significant difference in the mean value of achieving R&D capability, as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies indulging in various activities.

Table No. 27b : *Test Statistics for Strategic Alliances and Achieving R&D Capability - across different activities of pharmaceutical companies*

Company Activity	N	Mean	Std. Deviation	F	Sig.
Manufacturing	34	2.73	.86	**5.286**	**.001**
R&D	5	3.40	.54		
Manufacturing / R&D	24	3.70	1.12		
Contract Manufacturing	8	3.00	.92		
Distribution	2	1.50	.70		
Total	73	3.09	1.05		

Levene Statistic	df1	df2	Sig.
1.521	4	68	.206

The Levene's statistic is not significant (p >0.05) 0.206 indicating the homogeneity of variances. Level of significance is 0.001 (p=0.001) which is below 0.05 hence there is a statistically significant difference. There is statistically significant difference between groups as determined by one-way ANOVA (F (4,68)= 5.286 , p =0.001).

A Tukey post- hoc test revealed that mean difference is significant in two instances :between pharmaceutical companies with manufacturing as their core activity and Indian pharmaceutical companies with both manufacturing and R&D as their core activity (mean difference 0.97304 and p= 0.002) and between Indian pharmaceutical companies with

manufacturing and R&D as their core activity and pharmaceutical companies with Distribution as their core activity (mean difference 2.208 and p= 0.019).

Inference: The null hypothesis is not supported

5.5.2. c. Strategic alliances and achieving R&D capability –turnover of company

H027: There is no significant difference in the mean value of achieving R&D capability, as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of varying turnover.

Table No. 27c : *Test Statistics for Strategic Alliances and Achieving R&D Capability – across turnovers of Indian pharmaceutical companies*

Turnover Technology-R&D capability	N	Mean	Std. Deviation	F	Sig.
< 100 Cr.	16	2.50	1.09	**3.348**	**.024**
100 – 300 Cr.	8	3.25	1.03		
301- 500 Cr.	18	2.94	.63		
>500 Cr.	31	3.45	1.12		
Total	73	3.09	1.05		

Levene Statistic	df1	df2	Sig.
4.151	3	69	.009

The Levene's statistic is significant (p >0.05) 4.151.Level of significance is 0.024 (p=0.024) which is below 0.05 hence there is a statistically significant difference. There is statistically significant difference between groups as determined by one-way ANOVA (F (3,69)= 3.348 ,p =0.024)).

A Tukey post- hoc test revealed that mean difference is significant between companies with turnover <100 cr. and companies with turnover between > 500 cr. (mean difference 0.95161 and p= 0.016).

Inference: The null hypothesis is not supported

5.5.3. *Strategic Alliances and GMP Compliant Production Facilities*

5.5.3. a. Strategic alliances and GMP compliant production Facilities – type of company

H028: There is no significant difference in the mean value of development of GMP compliant production capacities by Indian pharmaceutical companies as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies.

Table No. 28a : *Test Statistics for Strategic Alliances and GMP Compliant Production Capacities –all types of companies*

Company Type Technology-GMP compliance	N	Mean	Std. Deviation	F	Sig.
API	29	3.27	.70	**3.398**	**.014**
Formulations	11	3.09	.83		
API & Formulations	25	3.88	.83		
Clinical Research	3	4.00	.00		
R&D	5	3.40	.54		
Total	73	3.49	.80		

Levene Statistic	df1	df2	Sig.
.969	4	68	.431

The Levene's statistic is not significant (p >0.05) .969 indicating the homogeneity of variances. Level of significance is 0.014 (p=0.014) which is below 0.05 hence there is a statistically significant difference. There is statistically a significant difference between groups as determined by one-way ANOVA (F (4,68)=3.398 ,p =0.014)).

A Tukey post- hoc test revealed that mean difference is significant in two instances: between pharmaceutical API companies and pharmaceutical API and formulation companies (mean difference 0.60414and p= 0.035) and, between formulations pharmaceutical companies and companies with both API and formulation (mean difference 0.78909 and p= 0.039).

Inference: The null hypothesis is not supporte

5.5.3.b. Strategic Alliances and GMP Compliant Production Facilities –activities of company

H029 : There is no significant difference in the mean value of development of GMP compliant production capacities by Indian pharmaceutical companies as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies performing different activities

Table No. 28b: *Test Statistics for Strategic Alliances and GMP Compliant Production Capacities – across different activities of companies*

Company Activity Technology-GMP compliance	N	Mean	Std. Deviation	F	Sig.
Manufacturing	34	3.20	.72	**3.026**	**.023**
R&D	5	3.60	.54		
Manufacturing / R&D	24	3.87	.85		
Contract Manufacturing	8	3.62	.51		
Distribution	2	3.00	1.41		
Total	73	3.49	.80		

Levene Statistic	df1	df2	Sig.
.497	4	68	.738

The Levene's statistic is not significant (p >0.05) .497 indicating the homogeneity of variances Level of significance is 0.023 (p=0.023) which is below 0.05 hence there is a statistically significant difference. There is statistically a significant difference between groups as determined by one-way ANOVA (F (4,68)=3.026 , p =0.023).

A Tukey post- hoc test revealed that mean difference is significant between pharmaceutical companies with manufacturing as their core activity and pharmaceutical companies with both manufacturing and R&D as their core activity (mean difference 0.66912 and p= 0.013).

Inference: The null hypothesis is not supported

5.5.3. c. Strategic Alliances and GMP Compliant Production Facilities – turnover of company

H030: There is no significant difference in the mean value of development of GMP compliant production capacities by Indian pharmaceutical companies as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of different turnover.

Table No. 28c : *Test Statistics for Strategic Alliances and GMP Compliant Production Capacities – across turnovers of Indian pharmaceutical companies*

Turnover / Technology-GMP compliance	N	Mean	Std. Deviation	F	Sig.
< 100 Cr.	16	3.18	.91	**3.043**	**.035**
100 – 300 Cr.	8	3.62	.517		
301- 500 Cr.	18	3.22	.54		
>500 Cr.	31	3.77	.84		
Total	73	3.49	.80		

Levene Statistic	df1	df2	Sig.
1.041	3	69	.380

The Levene's statistic is not significant (p >0.05) 1.041 indicating the homogeneity of variances Level of significance is 0.035 (p=0.035) which is below 0.05 hence there is a statistically significant difference. There is statistically a significant difference between groups as determined by one-way ANOVA (F (3,69)=3.043 , p =0.035).

A Tukey post- hoc test revealed that mean difference is not significant between pharmaceutical companies with differing turnovers.

Inference: The null hypothesis is not supported

5.5.4: Strategic Alliances and Access to Information

5.5.4.a Strategic alliances and access to information – type of companies

H031: There is no significant difference in the mean value of accessibility of Indian companies to latest technological and product related upgrades as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies on, across all types of Indian pharmaceutical companies.

Table No. 29a : *Test Statistics for Strategic Alliances and Access to Information –all types of pharmaceutical companies*

Company Type Technology-Access to information	N	Mean	Std. Deviation	F	Sig.
API	29	3.27	.79	**5.697**	**.001**
Formulations	11	3.27	.64		
API & Formulations	25	3.96	.61		
Clinical Research	3	4.33	.57		
R&D	5	4.20	.44		
Total	73	3.61	.77		

Levene Statistic	df1	df2	Sig.
1.031	4	68	.398

The Levene's statistic is negative (p >0.05) 1.031indicating the homogeneity of variances. Level of significance is 0.001 (p=0.001) which is above 0.05 hence there is no statistically significant difference. There is statistically no significant difference between groups as determined by one-way ANOVA (F (4,68)= 5.697 ,p =0.001)).

A Tukey post- hoc test revealed that mean difference is significant between pharmaceutical API companies and pharmaceutical API and formulation y(mean difference 0.68414and p= 0.005).

Inference: The null hypothesis is not supported

5.5.4. b, Strategic alliances and access to information – turnover of companies

H032: There is no significant difference in the mean value of accessibility of Indian companies to latest technological and product related upgrades impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of different turnover.

Table No. 29b : *Test Statistics for Strategic Alliances and Access to Information – across turnovers of Indian pharmaceutical companies*

Turnover Technology- Access to information	N	Mean	Std. Deviation	F	Sig.
< 100 Cr.	16	3.50	.89	2.532	.064
100 – 300 Cr.	8	3.62	.74		
301- 500 Cr.	18	3.27	.75		
>500 Cr.	31	3.87	.67		
Total	73	3.61	.77		

Levene Statistic	df1	df2	Sig.
1.166	3	69	.329

The Levene's statistic is non significant (p >0.05) 1.166 indicating the homogeneity of variances. Level of significance is 0.064 (p=0.064) which is below 0.05 hence there is a statistically significant difference. There is statistically significant difference between groups as determined by one-way ANOVA (F (3,69)= 2.532 ,p =0.064)).

Inference: The null hypothesis is supported

5.5.4. c. Strategic alliances and access to information – activity of companies

H033: There is no significant difference in the mean value of accessibility of Indian companies to latest technological and product related upgrades as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies with different activities.

Table No. 29c : *Test Statistics for Strategic Alliances and Access to Information – across different activities of pharmaceutical companies*

Company Activity Technology-Access to information	N	Mean	Std. Deviation	F	Sig.
Manufacturing	34	3.20	.64	**6.175**	**.000**
R&D	5	4.20	.44		
Manufacturing / R&D	24	4.00	.65		
Contract Manufacturing	8	3.87	.64		
Distribution	2	3.50	2.12		
Total	73	3.61	.77		

Levene Statistic	df1	df2	Sig.
2.977	4	68	.025

The Levene's statistic is not significant (p >0.05) 2.977 indicating the homogeneity of variances. Level of significance is 0.000 (p=0.000) which is below 0.05 hence there is a statistically significant difference. There is statistically significant difference between groups as determined by one-way ANOVA (F (4,68)= 6.175 , p =0.000).

A Tukey post- hoc test revealed that mean difference is significant in two instances: between pharmaceutical companies with manufacturing as their core activity and pharmaceutical companies with both manufacturing and R&D as their core activity (mean difference 0.99412 and p= 0.027) and between pharmaceutical companies with manufacturing asa their core activity and companies with both manufacturing and R&D as their core activity (mean difference 0.79412and p= 0.000).

Inference : ***The null hypothesis is not supported***

5.6: Impact of Strategic Alliances Between Indian and Foreign Pharmaceutical Companies on Manufacturing

5.6.1. Strategic Alliances and Cost Optimization

5.6.1.a. Strategic alliances and cost optimization – type of company

H034: There is no significant difference in the mean value of cost optimization as an area of impact on strategic alliances between Indian and foreign pharmaceutical companies, across the types of Indian pharmaceutical companies.

Table No.30a : *Test Statistics for Strategic Alliances and Cost Optimization – all types of pharmaceutical companies*

Company Type Manufacturing-Cost minimization	N	Mean	Std. Deviation	F	Sig.
API	29	3.17	.80	1.236	.304
Formulations	11	2.90	1.13		
API & Formulations	25	2.64	.95		
Clinical Research	3	2.66	.57		
R&D	5	3.00	.70		
Total	73	2.91	.90		

Levene Statistic	df1	df2	Sig.
.972	4	68	.428

The Levene's statistic is not significant (p >0.05) .972 indicating the homogeneity of variances. Level of significance is 0.304 (p=0.304) which is above 0.05 hence there is no statistically significant difference. There is no statistically significant difference between groups as determined by one-way ANOVA (F (4,68)= 1.236 , p =0.304).

Inference: The null hypothesis is supported

5.6.1.b. Strategic alliances and cost optimization – activity of company

H035: There is no significant difference in the mean value of cost optimization as an area of impact on strategic alliances between Indian and foreign pharmaceutical companies across the types of activity undertaken by Indian pharmaceutical companies.

Table No.30b: *Test Statistics for Strategic Alliances and Cost Optimization – across different activities of pharmaceutical companies*

Company Activity Manufacturing-Cost minimization	N	Mean	Std. Deviation	F	Sig
Manufacturing	34	3.05	.91	**1.602**	**.184**
R&D	5	3.00	.70		
Manufacturing / R&D	24	2.62	.92		
Contract Manufacturing	8	2.87	.64		
Distribution	2	4.00	1.41		
Total	73	2.91	.90		

Levene Statistic	df1	df2	Sig.
1.079	4	68	.374

The Levene's statistic is not significant (p >0.05) 1.079 indicating the homogeneity of variances. Level of significance is 0.184 (p=0.184) which is above 0.05 hence there is no statistically significant difference. There is no statistically significant difference between groups as determined by one-way ANOVA (F (4,68)= 1.602 , p =0.184).

Inference: The null hypothesis is supported

5.6.1.c. Strategic alliances and cost optimization – turnover of company

H036: There is no significant difference in the mean value of cost optimization as an area of impact on strategic alliances between Indian and foreign pharmaceutical companies across Indian pharmaceutical companies of varying turnover.

Table No. 30c: *Test Statistics for Strategic Alliances and Cost Optimization – across different turnover of pharmaceutical companies*

Turnover Manufacturing-Cost minimization	N	Mean	Std. Deviation	F	Sig.
< 100 Cr.	16	3.00	.96	**1.462**	**.232**
100 – 300 Cr.	8	3.50	.92		
301- 500 Cr.	18	2.77	.80		
>500 Cr.	31	2.80	.90		
Total	73	2.91	.90		

Levene Statistic	df1	df2	Sig.
.108	3	69	.955

The Levene's statistic is not significant (p >0.05) 0.108 indicating the homogeneity of variances. Level of significance is 0.232 (p=0.232) which is above 0.05 hence there is no statistically significant difference. There is no statistically significant difference between groups as determined by one-way ANOVA (F (3,69)= 1.462 , p =0.232).

Inference: The null hypothesis is supported

5.6.2. *Strategic Alliances and Achieving Operational Synergy*

5.6.2.a.Strategic alliances and achieving operational synergy – type of company

H037: There is no significant difference in the mean value of achieving operational synergy as an area of impact on strategic alliances between Indian and foreign pharmaceutical companies across the types of Indian pharmaceutical companies.

Table No. 31a: *Test Statistics for Strategic Alliances and Achieving Operational Synergy – all types of pharmaceutical companies*

Company Type Manufacturing-Common assets	N	Mean	Std. Deviation	F	Sig. .
API	29	2.86	1.02	**.463**	**.763**
Formulations	11	3.09	.70		
API & Formulations	25	2.80	.91		
Clinical Research	3	2.33	1.15		
R&D	5	3.00	.70		
Total	73	2.86	.91		

Levene Statistic	df1	df2	Sig.
.490	4	68	.743

The Levene's statistic is not significant (p >0.05) 0.490 indicating the homogeneity of variances.Level of significance is 0.763 (p=0.763) which is above 0.05 hence there is no statistically significant difference. There is no statistically significant difference between groups as determined by one-way ANOVA (F (4,68)= 0.463 , p =0.763).

Inference: The null hypothesis is supported

5.6.2. Strategic Alliances and Achieving Operational Synergy 5.6.2.b. Strategic alliances and achieving operational synergy – activity of company

H038: There is no significant difference in the mean value of achieving operational synergy as an area of impact on strategic alliances between Indian and foreign pharmaceutical companies across the types of activity undertaken by Indian pharmaceutical companies.

Table No. 31b: *Test Statistics for Strategic Alliances and Achieving Operational Synergy – type of company*

Company Activity Manufacturing-Common assets	N	Mean	Std. Deviation	F	Sig.
Manufacturing	34	2.82	.99	**.411**	**.800**
R&D	5	2.80	1.09		
Manufacturing / R&D	24	2.79	.93		
Contract Manufacturing	8	3.25	.46		
Distribution	2	3.00	.00		
Total	73	2.86	.91		

Levene Statistic	df1	df2	Sig.
1.090	4	68	.369

The Levene's statistic is not significant (p >0.05) 1.090 indicating the homogeneity of variances.

Level of significance is 0.800 (p=0.800) which is above 0.05 hence there is no statistically significant difference. There is no statistically significant difference between groups as determined by one-way ANOVA (F (4,68)= 0.411 ,p =0.800)

Inference: The null hypothesis is supported

5.6.2. Strategic Alliances and Achieving Operational Synergy

5.6.2.c .Strategic alliances and achieving operational synergy – turnover company

H039: There is no significant difference in the mean value of achieving operational synergy as an area of impact on strategic alliances between Indian and foreign pharmaceutical companies across Indian pharmaceutical companies of varying turnover.

Table No. 31c: *Test Statistics for Strategic Alliances and Achieving Operational Synergy –across different turnover of Pharmaceutical companies*

Turnover Manufacturing-Common assets	N	Mean	Std. Deviation	F	Sig.
< 100 Cr.	16	2.56	1.03	**.746**	**.528**
100 – 300 Cr.	8	2.87	.83		
301- 500 Cr.	18	2.94	.80		
>500 Cr.	31	2.96	.94		
Total	73	2.86	.91		

Levene Statistic	df1	df2	Sig.
.973	3	69	.410

The Levene's statistic is not significant (p >0.05) 0..973 indicating the homogeneity of variances. Level of significance is 0.528 (p=0.528) which is above 0.05 hence there is no statistically significant difference. There is no statistically significant difference between groups as determined by one-way ANOVA (F (3,69)= 0.746, p =0.528).

Inference: The null hypothesis is supported

5.6.3. Strategic Alliances and Quality Management

5.6.3. a. Strategic alliances and quality management –type of company

H040: There is no significant difference in the mean value of quality related skills acquired by Indian pharmaceutical companies, as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies.

Table No. 32a: *Test Statistics for Strategic Alliances and Quality Management –all types of pharmaceutical companies*

Company Type	N	Mean	Std. Deviation	F	Sig.
API	29	3.37	.72	**1.015**	**.406**
Formulations	11	3.72	.46		
API & Formulations	25	3.52	.77		
Clinical Research	3	3.00	.00		
R&D	5	3.20	.83		
Total	73	3.45	.70		

Levene Statistic	df1	df2	Sig.
2.976	4	68	.025

The Levene's statistic is not significant (p >0.05) 2.976 indicating the homogeneity of variances.

Level of significance is 0.406 (p=0.406) which is above 0.05 hence there is no statistically significant difference. There is no statistically significant difference between groups as determined by one-way ANOVA (F (4,68)= 1.015, p =0.406).

Inference: The null hypothesis is supported

5.6.3. b. Strategic alliances and quality management –turnover of company

H041: There is no significant difference in the mean value of quality related skills acquired by Indian pharmaceutical companies, as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of different turnover.

Table No. 32b: *: Test Statistics for Strategic Alliances and Quality Management –across different turnover of pharmaceutical companies*

Turnover Manufacturing-Quality management	N	Mean	Std. Deviation	F	Sig.
< 100 Cr.	16	3.43	.62	**1.446**	**.237**
100 – 300 Cr.	8	3.62	1.18		
301- 500 Cr.	18	3.11	.58		
>500 Cr.	31	3.22	.56		
Total	73	3.28	.67		

Levene Statistic	df1	df2	Sig.
2.118	3	69	.106

The Levene's statistic is not significant (p >0.05) 2.118 indicating the homogeneity of variances. Level of significance is 0.237 (p=0.237) which is above 0.05 hence there is no statistically significant difference. There is no statistically significant difference between groups as determined by one-way ANOVA (F (3,69)= 1.446, p =0.237).

Inference: The null hypothesis is supported

5.6.3. c. Strategic alliances and quality management – activity of company

H042: There is no significant difference in the mean value of quality related skills acquired by Indian pharmaceutical companies, as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies with different activities.

Table No. 32c: *: Test Statistics for Strategic Alliances and Quality Management – across different activities of pharmaceutical companies*

Company Activity Manufacturing-Quality management	N	Mean	Std. Deviation	F	Sig.
Manufacturing	34	3.38	.69	.412	**.800**
R&D	5	3.40	.54		
Manufacturing / R&D	24	3.50	.78		
Contract Manufacturing	8	3.50	.75		
Distribution	2	4.00	.00		
Total	73	3.45	.70		

Levene Statistic	df1	df2	Sig.
1.620	4	68	.179

The Levene's statistic is not significant (p >0.05) 1.620 indicating the homogeneity of variances. Level of significance is 0.800 (p=0.800) which is above 0.05 hence there is no statistically significant difference. There is no statistically significant difference between groups as determined by one-way ANOVA (F (4,68)= 0.412 , p =0.800).

Inference: The null hypothesis is supported

5.7: Impact of Strategic Alliances between Indian and Foreign Pharmaceutical Companies on the Competitive Advantage

5.7.1. Strategic Alliances and Increased Market Share

5.7.1. a Strategic alliances and increased market share – type of company

H043: There is no significant difference in the mean values of increased market share as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies.

Table No. 33a : *Test Statistics for Strategic Alliances and Increased Market Share – all types of pharmaceutical companies*

Company Type Competitive Advantage- Increased market share	N	Mean	Std. Deviation	F	Sig.
API	29	3.82	.71	**1.817**	**.136**
Formulations	11	3.54	1.12		
API & Formulations	25	4.16	.55		
Clinical Research	3	4.33	.57		
R&D	5	3.80	.44		
Total	73	3.91	.74		

Levene Statistic	df1	df2	Sig.
1.971	4	68	.109

The Levene's statistic is not significant (p >0.05) 1.971 indicating the homogeneity of variances Level of significance is 0.136 (p=0.136) which is above 0.05 hence there is no statistically significant difference. There is no statistically significant difference between groups as determined by one-way ANOVA (F (4,68)= 1.817 , p =0.136).

Inference: The null hypothesis is supported

5.7.1. Strategic Alliances and Increased Market Share

5.7.1. b. Strategic alliances and increased market share – activity of company

H044: There is no significant difference in the mean values of increased market share as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies indulging in various activities.

Table No. 33b : *Test Statistics for Strategic Alliances and Increased Market Share – across different activities of pharmaceutical companies*

Company Activity Competitive Advantage-Increased market share	N	Mean	Std. Deviation	F	Sig.
Manufacturing	34	3.76	.88	**1.463**	**.223**
R&D	5	3.80	.44		
Manufacturing / R&D	24	4.20	.58		
Contract Manufacturing	8	3.75	.46		
Distribution	2	4.00	.00		
Total	73	3.91	.74		

Levene Statistic	df1	df2	Sig.
1.601	4	68	.184

The Levene's statistic is not significant (p >0.05) 1.601 indicating the homogeneity of variances. Level of significance is 0.223 (p=0.223) which is above 0.05 hence there is no statistically significant difference. There is no statistically significant difference between groups as determined by one-way ANOVA (F (4,68)= 1.463 , p =0.223).

Inference: The null hypothesis is supported

5.7.1. c. Strategic alliances and increased market share – turnover of company

H045: There is no significant difference in the mean value of increased market share as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of differing turnovers.

Table No. 33 c: *Test Statistics for Strategic Alliances and Increased Market Share – across different turnover of pharmaceutical companies*

Turnover Competitive Advantage-Increased market share	N	Mean	Std. Deviation	F	Sig.
< 100 Cr.	16	3.75	.85	**1.652**	**.185**
100 – 300 Cr.	8	3.62	1.18		
301- 500 Cr.	18	3.83	.51		
>500 Cr.	31	4.12	.61		
Total	73	3.91	.74		

Levene Statistic	df1	df2	Sig.
1.951	3	69	.129

The Levene's statistic is not significant (p >0.05) 1.951 indicating the homogeneity of variances Level of significance is 0.185 (p=0.185) which is above 0.05 hence there is no

statistically significant difference. There is no statistically significant difference between groups as determined by one-way ANOVA (F (3, 69) = 1.652, p =0.185).

Inference: The null hypothesis is supported

5.7.2. Strategic Alliances and Increased Overall Profitability

5.7.2. a. Strategic alliances and increased overall profitability -type of company

H046: There is no significant difference in the mean value of on enhanced profitability as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of differing company types.

Table No. 34a: *Test Statistics for Strategic Alliances and Overall Profitability – all types of pharmaceutical companies*

Company Type Competitive Advantage-Increased profits	N	Mean	Std. Deviation	F	Sig.
API	29	3.82	.75	**3.770**	**.008**
Formulations	11	3.36	1.02		
API & Formulations	25	4.36	.70		
Clinical Research	3	4.00	.00		
R&D	5	4.20	.44		
Total	73	3.97	.81		

Levene Statistic	df1	df2	Sig.
2.905	4	68	.028

The Levene's statistic is not significant (p >0.05) 2.905 indicating the homogeneity of variances There is statistically significant difference between groups as determined by one-way ANOVA (F (4,68)= 3.770 ,p =0.008)).

A Tukey post- hoc test revealed that mean difference is significant between pharmaceutical API companies and pharmaceutical API and formulation (MD 0.99636 and p= 0.005).

Inference: The null hypothesis is not supported

5.7.2. b. Strategic alliances and increased overall profitability – type of activity

H047: There is no significant difference in the mean value of on enhanced profitability as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies indulging in various activities.

Table No. 34 b: *Test Statistics for Strategic Alliances and Overall Profitability – across different activities of pharmaceutical companies*

Company Activity Competitive Advantage- Increased profits	N	Mean	Std. Deviation	F	Sig.
Manufacturing	34	3.70	.87	**3.449**	**.013**
R&D	5	4.20	.44		
Manufacturing / R&D	24	4.37	.71		
Contract Manufacturing	8	3.62	.51		
Distribution	2	4.50	.70		
Total	73	3.97	.81		

Levene Statistic	df1	df2	Sig.
1.613	4	68	.181

The Levene's statistic is not significant (p >0.05) 1.613 indicating the homogeneity of variances. Level of significance is 0.013 (p=0.013) which is below 0.05 hence there is a statistically significant difference. There is statistically significant difference between groups as determined by one-way ANOVA (F (4,68)= 3.449 ,p =0.013).

A Tukey post- hoc test revealed that mean difference is significant between pharmaceutical companies with manufacturing as their core activity and pharmaceutical companies with both manufacturing and R&D as their core activity (mean difference 0.66912 and p= 0.014).

Inference: The null hypothesis is not supported

5.7.2. c. Strategic alliances and increased overall profitability - turnover

H048: There is no significant difference in the mean value of on enhanced profitability as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of differing turnovers.

Table No. 34 c: *Test Statistics for Strategic Alliances and Overall Profitability –across different turnover of pharmaceutical companies*

Turnover Competitive Advantage-Increased profits	N	Mean	Std. Deviation	F	Sig..
< 100 Cr.	16	3.62	.95	**4.793**	**.004**
100 – 300 Cr.	8	4.12	.99		
301- 500 Cr.	18	3.61	.60		
>500 Cr.	31	4.32	.65		
Total	73	3.97	.81		

Levene Statistic	df1	df2	Sig.
1.498	3	69	.223

The Levene's statistic is not significant (p >0.05) 1.498 indicating the homogeneity of variances. Level of significance is 0.004 (p=0.004) which is below 0.05 hence there is a statistically significant difference. There is statistically significant difference between groups as determined by one-way ANOVA (F (3,69)= 4.793 ,p =0.004 .

Tukey post- hoc test revealed that mean difference is significant between pharmaceutical companies with differing turnovers 301 -500 cr. and >500 cr. (mean difference 0.54122 and p= 0.042).

Inference: The null hypothesis is not supported

5.7.3. Strategic Alliances and Brand Building

5.7.3. a. Strategic alliances and brand building – Activity of company

H049: There is no significant difference in the mean value of establishment of Indian pharmaceutical brand names in the global market *as an area of* impact of strategic alliances between Indian and foreign pharmaceutical companies, across the types of activities undertaken by Indian pharmaceutical companies.

***Table No. 35a**: Test Statistics for Strategic Alliances and Brand Building – Across different Activities of pharmaceutical companies*

Company Activity Competitive Advantage-Established new brands	N	Mean	Std. Deviation	F	Sig.
Manufacturing	34	3.6471	.73371	**2.510**	**.050**
R&D	5	3.8000	.44721		
Manufacturing / R&D	24	4.1667	.63702		
Contract Manufacturing	8	3.8750	.64087		
Distribution	2	4.5000	.70711		
Total	73	3.8767	.70603		

Levene Statistic	df1	df2	Sig.
1.193	4	68	.322

The Levene's statistic is not significant (p >0.05) 1.193 indicating the homogeneity of variances. Level of significance is 0.050 (p=0.050) which is equal 0.05 hence there is no statistically significant difference. There is statistically significant difference between groups as determined by one-way ANOVA (F (4,68)= 2.510 ,p =0.050).

Inference: The null hypothesis is supported

5.7.3. b. Strategic alliances and brand building – Type of company

H050: There is no significant difference in the mean value of establishment of Indian pharmaceutical brand names in the global market as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across the types of Indian pharmaceutical companies.

***Table No. 35b**: Test Statistics for Strategic Alliances and Brand Building –all types of pharmaceutical companies*

Company Type Competitive Advantage-Establish new brands	N	Mean	Std. Deviation	F	Sig..
API	29	3.75	.63	**1.981**	**.107**
Formulations	11	3.54	.93		
API & Formulations	25	4.12	.66		
Clinical Research	3	4.33	.57		
R&D	5	3.80	.44		
Total	73	3.87	.70		

Levene Statistic	df1	df2	Sig.
1.550	4	68	.198

The Levene's statistic is not significant (p >0.05) 1.550 indicating the homogeneity of variances. Level of significance is 0.107 (p=0.107) which is above 0.05 hence there is no statistically significant difference. There is no statistically significant difference between groups as determined by one-way ANOVA (F (4,68)= 1.981 ,p =0.107).

Inference: The null hypothesis is supported

5.7.3. c. Strategic alliances and brand building – Turnover of company

H051: There is no significant difference in the mean value of establishment of Indian pharmaceutical brand names in the global market as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of varying turnover.

Table No. 35c: *Test Statistics for Strategic Alliances and Brand Building – across different turnover of pharmaceutical companies*

Turnover Competitive Advantage-Establish new brands	N	Mean	Std. Deviation	F.	Sig.
< 100 Cr.	16	3.68	.87	**3.2333**	**.027**
100 – 300 Cr.	8	4.12	.64		
301- 500 Cr.	18	3.55	.51		
>500 Cr.	31	4.09	.65		
Total	73	3.87	.70		

Levene Statistic	df1	df2	Sig.
1.855	3	69	.145

The Levene's statistic is not significant (p >0.05) 1.855 indicating the homogeneity of variancesLevel of significance is 0.027 (p=0.027) which is below 0.05 hence there is a statistically significant difference. There is statistically significant difference between groups as determined by one-way ANOVA (F (3,69)= 3.233 ,p =0.027).

A Tukey post- hoc test revealed that mean difference is significant between pharmaceutical companies with differing turnovers 301 -500 cr. and >500 cr. (mean difference 0.66912 and p= 0.014).

Inference: The null hypothesis is not supported

5.7.4. Strategic Alliances and Acquiring Superior Managerial Skills

5.7.4. a. Strategic alliances and acquiring superior managerial skills – company activity

H052: There is no significant difference in the mean values of acquisition of management skills by Indian pharmaceutical companies as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies on the, across all types of Indian pharmaceutical companies.

Table No. 36 a: *Test Statistics for Strategic Alliances and Acquiring Superior Managerial Skills – all types of pharmaceutical companies*

Company Type Competitive Advantage-Managerial capabilities	N	Mean	Std. Deviation	F	Sig.
API	29	3.58	.68	**1.673**	**.166**
Formulations	11	3.45	.68		
API & Formulations	25	3.88	.78		
Clinical Research	3	4.33	.57		
R&D	5	4.00	.70		
Total	73	3.72	.73		

Levene Statistic	df1	df2	Sig.
.307	4	68	.872

The Levene's statistic is not significant (p >0.05) .307 indicating the homogeneity of variances Level of significance is 0.166 (p=0.166) which is above 0.05 hence there is no statistically significant difference. There is no statistically significant difference between groups as determined by one-way ANOVA (F (4,68)= 1.673 ,p =0.166).

Inference: The null hypothesis is supported

5.7.4. b. Strategic alliances and acquiring superior managerial skills – company turnover

H053: There is no significant difference in the mean value of acquisition of management skills by Indian pharmaceutical companies as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of different turnover.

Table No. 36b: *Test Statistics for Strategic Alliances and Acquiring Superior Managerial Skills – across different turnovers of pharmaceutical companies*

Turnover Competitive Advantage- Managerial capabilities	N	Mean	Std. Deviation	f	Sig.
< 100 Cr.	16	3.62	.80	**1.613**	**.194**
100 – 300 Cr.	8	3.62	.74		
301- 500 Cr.	18	3.50	.61		
>500 Cr.	31	3.93	.72		
Total	73	3.72	.73		

Levene Statistic	df1	df2	Sig.
.721	3	69	.543

The Levene's statistic is not significant (p >0.05) .721 indicating the homogeneity of variances Level of significance is 0.194 (p=0.194) which is above 0.05 hence there is no statistically significant difference. There is no statistically significant difference between groups as determined by one-way ANOVA (F (3,69)= 1.613 ,p =0.194).

Inference: The null hypothesis is supported

5.7.4. c. Strategic alliances and acquiring superior managerial skills – company activity

H054: There is no significant difference in the mean value of acquisition of management skills by Indian pharmaceutical companies as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across pharmaceutical companies indulging in various activities.

Table No. 36c : *Test Statistics for Strategic Alliances and Acquiring Superior Managerial Skills –Across different activities of pharmaceutical companies*

Company Activity Competitive Advantage-Managerial capabilities	N	Mean	Std. Deviation	F	Sig.
Manufacturing	34	3.47	.66	**3.612**	**.010**
R&D	5	4.20	.44		
Manufacturing / R&D	24	4.00	.78		
Contract Manufacturing	8	3.50	.53		
Distribution	2	4.50	.70		
Total	73	3.72	.73		

Levene Statistic	df1	df2	Sig.
.538	4	68	.708

The Levene's statistic is not significant (p >0.05) .538 indicating the homogeneity of variances. Level of significance is 0.010 (p=0.010) which is below 0.05 hence there is a statistically significant difference. There is statistically significant difference between groups as determined by one-way ANOVA (F (4, 68)= 3.612 ,p =0.010)).

A Tukey post- hoc test revealed that mean difference is significant between pharmaceutical companies with manufacturing as their core activity and pharmaceutical companies with both manufacturing and R&D as their core activity (mean difference 0.52941 and p= 0.038).

Inference: The null hypothesis is not support

5.8 Hindrances for Strategic Alliance

Table 37 Test statistics –Hindrances for Strategic alliance

	N	Mean	Std. Deviation
External Hindrances			
Lack of Information	73	3.38	.98
Govt. policies	73	3.52	.80

Internal Hindrances			
Unclear objectives	73	3.34	.73
Lack of communication	73	3.71	.73
Non monitoring of alliance	73	3.68	.66
Lack of trust	73	3.79	.79

Inference:

Lack of information pertaining to companies, their core activities is a strong de-motivator for the formation of strategic alliances between Indian and foreign pharmaceutical companies. L ack of governmental policies on strategic alliances is a strong demotivator for the formation of strategic alliances between Indian and foreign pharmaceutical companies. Unclear and loosely defined objective is a strong internal reason for failures of alliances between Indian and foreign pharmaceutical companies Lack of communication between the alliancing partners is a strong internal reason for failures of alliances between Indian and foreign pharmaceutical companies Non monitoring of the progress of the alliance is a strong internal reason for failures of alliances between Indian and foreign pharmaceutical companies Lack of trust between the two alliancing companies is a strong internal reason for failures of alliances between Indian and foreign pharmaceutical companies.

5.9 Summary

Reasons for the Formation of Alliances between Indian and Foreign Pharmaceutical Companies

No		Mean	SD	Rank
1	Strengthen product portfolio	3.83	.62	6
2	Establishing brands abroad	3.94	.76	4
3	Launching new product lines	3.76	.71	8
4	Entering global emerging markets	3.83	.62	7
5	Entering regulated markets	3.94	.76	3

6	Establishing distribution channels abroad	3.76	.71	9
7	Accessing new technology	3.32	.64	10
8	Undertaking collaborative R&D	3.30	.90	11
9	Obtaining USFDA approved	3.17	.93	13
10	Cost minimization	2.91	.90	14
11	Achieving operational synergy	2.86	.91	15
12	Achieving quality management	3.28	.67	12
13	Achieving market position	3.91	.72	5
14	Achieving financial power	3.98	.69	2
15	Enhancing company image	4.04	.71	1

Impact of Strategic Alliances between Indian and Foreign Pharmaceutical Companies on Indian Pharmaceutical Companies

No	*Null Hypotheses*	Level of Sig.	Outcome
H01	There is no significant difference in the mean value of launch of new patented molecules as an area if impact of strategic alliances between Indian and foreign pharmaceutical companies across the types of Indian pharmaceutical companies	0.061	Supported
H02	There is no significant difference in the mean value of launch of patented molecules as an area of impact of strategic alliances between Indian an foreign pharmaceutical companies, across the types of activity undertaken by Indian pharmaceutical companies	0.002	*Not supported*
H03	There is no significant difference in the mean value of launch of patented molecules as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of differing turnover	0.005	*Not supported*
H04	There is no significant difference in the mean value of launch of generic pharmaceutical products abroad as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies	0.102	Supported
H05	There is no significant difference in the mean value of launch of generic pharmaceutical products abroad as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies indulging in various activities	0.010	*Not supported*
H06	There is no significant difference in the mean value of launch of generic pharmaceutical products abroad as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of varying turnover	0.001	*Not supported*
H07	There is no significant difference in the mean value of launch of new generic pharmaceutical products in the domestic market as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across the types of Indian pharmaceutical companies	0.201	Supported
H08	There is no significant difference in the mean value of launch of new generic pharmaceutical products in the domestic market as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies across the types of activity undertaken by Indian pharmaceutical companies	0.056	Supported
H09	There is no significant difference in the mean value of launch of new generic pharmaceutical products in the domestic market as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies with different turnovers	0.048	*Not supported*
H010	There is no significant difference in the mean value of expansion of product	0.165	Supported

	portfolio as an area impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies		
H011	There is no significant difference in the mean value of expansion of product portfolio as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies indulging in various activities	0.005	*Not supported*
H012	There is no significant difference in the mean value of expansion of product portfolio as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of varying turnover	0.110	Supported
H013	There is no significant difference in the mean value of access to highly regulated markets abroad as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies	0.697	Supported
H014	There is no significant difference in the mean value of access to highly regulated markets abroad as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies undertaking different activities	0.096	Supported
H015	There is no significant difference in the mean value of access to highly regulated markets abroad as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies across Indian pharmaceutical companies of different turnover	0.191	Supported
H016	There is no significant difference in the mean value gaining investment capability into sales and marketing as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies	0.000	*Not supported*
H017	There is no significant difference in the mean value of gaining investment capability into sales and marketing, as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical with varying business activities	0.000	*Not supported*
H018	There is no significant difference in the mean value of gaining investment capability into sales and marketing, as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies with varying turnover	0.001	*Not supported*
H019	There is no significant difference in the mean value of gaining access to foreign distribution networks abroad as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies	0.001	*Not supported*
H020	There is no significant difference in the mean value of gaining access to foreign distribution networks abroad as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies with differing turnover	0.015	*Not supported*
H021	There is no significant difference in the mean value of gaining access to foreign distribution networks abroad as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, Indian pharmaceutical companies undertaking different activities	0.000	*Not supported*
H022	There is no significant difference in the mean value of gaining technological competency as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies	0.691	Supported
H023	There is no significant difference in the mean value of gaining technological competency as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies indulging in various activities	0.139	Supported

H024	There is no significant difference in the mean value of gaining technological competency as an area impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of varying turnover	0.301	Supported
H025	There is no significant difference in the mean value of achieving R&D capability, as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies	0.039	*Not supported*
H026	There is no significant difference in the mean value of achieving R&D capability, as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies indulging in various activities	0.001	*Not supported*
H027	There is no significant difference in the mean value of achieving R&D capability, as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of varying turnover	0.024	*Not supported*
H028	There is no significant difference in the mean value of development of GMP compliant production capacities by Indian pharmaceutical companies as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies	0.014	*Not supported*
H029	There is no significant difference in the mean value of development of GMP compliant production capacities by Indian pharmaceutical companies as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies performing different activities	0.023	*Not supported*
H030	There is no significant difference in the mean value of development of GMP compliant production capacities by Indian pharmaceutical companies as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of different turnover	0.035	*Not supported*
H031	There is no significant difference in the mean value of accessibility of Indian companies to latest technological and product related upgrades as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies on, across all types of Indian pharmaceutical companies	0.001	*Not supported*
H032	There is no significant difference in the mean value of accessibility of Indian companies to latest technological and product related upgrades impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of different turnover	0.064	Supported
H033	There is no significant difference in the mean value of accessibility of Indian companies to latest technological and product related upgrades as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies , across Indian pharmaceutical companies with different activities	0.000	*Not supported*
H034	There is no significant difference in the mean value of cost optimization as an area of impact on strategic alliances between Indian and foreign pharmaceutical companies, across the types of Indian pharmaceutical companies	0.304	Supported
H035	There is no significant difference in the mean value of cost optimization as an area of impact on strategic alliances between Indian and foreign pharmaceutical companies, across the types of activity undertaken by Indian pharmaceutical companies	0.184	Supported
H036	There is no significant difference in the mean value of cost optimization as an area of impact on strategic alliances between Indian and foreign pharmaceutical companies across Indian pharmaceutical companies of varying turnover.	0.232	Supported
H037	There is no significant difference in the mean value of achieving operational synergy as an area of impact on strategic alliances between Indian and foreign	0.763	Supported

	pharmaceutical companies across the types of Indian pharmaceutical companies.		
H038	There is no significant difference in the mean value of achieving operational synergy as an area of impact on strategic alliances between Indian and foreign pharmaceutical companies across the types of activity undertaken by Indian pharmaceutical companies.	0.800	Supported
H039	There is no significant difference in the mean value of achieving operational synergy as an area of impact on strategic alliances between Indian and foreign pharmaceutical companies across Indian pharmaceutical companies of varying turnover	0.528	Supported
H040	There is no significant difference in the mean value of quality related skills acquired by Indian pharmaceutical companies, as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies	0.406	Supported
H041	There is no significant difference in the mean value of quality related skills acquired by Indian pharmaceutical companies, as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of different turnover	0.237	Supported
H042	There is no significant difference in the mean value of quality related skills acquired by Indian pharmaceutical companies, as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies with different activities	0.800	Supported
H043	There is no significant difference in the mean values of increased market share as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across all types of Indian pharmaceutical companies	0.136	Supported
H044	There is no significant difference in the mean values of increased market share as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies indulging in various activities	0.223	Supported
H045	There is no significant difference in the mean value of increased market share as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of differing turnovers	0.185	Supported
H046	There is no significant difference in the mean value of on enhanced profitability as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of differing company types	0.008	*Not supported*
H047	There is no significant difference in the mean value of on enhanced profitability as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies indulging in various activities	0.013	*Not supported*
H048	There is no significant difference in the mean value of on enhanced profitability as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of differing turnovers	0.004	*Not supported*
H049	There is no significant difference in the mean value of establishment of Indian pharmaceutical brand names in the global market *as an area of* impact of strategic alliances between Indian and foreign pharmaceutical companies, across the types of activities undertaken by Indian pharmaceutical companies	0.050	Supported
H050	There is no significant difference in the mean value of establishment of Indian pharmaceutical brand names in the global market as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across the types of Indian pharmaceutical companies	0.107	Supported

H051	There is no significant difference in the mean value of establishment of Indian pharmaceutical brand names in the global market as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of varying turnover	0.027	*Not supported*
H052	There is no significant difference in the mean values of acquisition of management skills by Indian pharmaceutical companies as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies on the, across all types of Indian pharmaceutical companies	0.166	Supported
H053	There is no significant difference in the mean value of acquisition of management skills by Indian pharmaceutical companies as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across Indian pharmaceutical companies of different turnover	0.194	Supported
H054	There is no significant difference in the mean value of acquisition of management skills by Indian pharmaceutical companies as an area of impact of strategic alliances between Indian and foreign pharmaceutical companies, across pharmaceutical companies indulging in various activities	0.010	*Not supported*

Hindrances for Formation of Strategic Alliances between Indian and Foreign Pharmaceutical Companies on Indian Pharmaceutical Companies

No	*Variable*	Mean	SD	Rank
1	Lack of data related to organizations and their interests	3.38	.98	*5*
2	Lack of governmental policies and	3.52	.80	*4*
3	Unclear alliance objectives of Indian pharmaceutical companies regarding alliance formation	3.34	.73	*6*
4	Lack of communication among between alliancing Indian and foreign pharmaceutical companies	3.71	.73	*2*
5	Lack of alliance progress monitoring between Indian and foreign pharmaceutical companies	3.68	.66	*3*
6	Lack of Trust among alliancing companies	3.79	.79	*1*

5.10. Correlation between the Strategic Alliances and the Identified Factors

This section discusses in detail the relationship that can be drawn with the primary research data and the impact of this data on managerial decision making with respect to problems related to strategic alliances between Indian and foreign pharmaceutical companies.

Reasons for strategic alliances

It's well known that foreign MNCs look at India as a high potential market for their products and set up alliances with Indian companies to market and launch their products. However

Indian companies as well seek out foreign collaborations for many reasons. This becomes the core objective which drives the strategic alliance. The reasons which have encouraged the formation of strategic alliances between Indian and foreign pharmaceutical companies can be categorized under 5 reasons:

- Product related
- Marketing and Distribution related
- Technology
- Manufacturing
- Gain Competitive advantage

5.10.1: Strategic Alliance and Product Related Reasons

Table 38 a Test statistics– Product Related Reasons for Strategic alliance

	Mean	Std. Deviation	N
Type of Activity	2.16	1.214	73
Product-Strengthen product portfolio	3.5479	.88256	73
Product-Launch new brands abroad	3.6164	.92241	73
Product-Launch new products	3.6712	.68829	73

The factor launching new products (M = 3.67, SD = 0.688) was stronger than the launching new products abroad (M=3.61, SD=0.92) and the factor strengthen product portfolio (M = 3.54, SD = 0.88).

Table 38 b Product Related Reasons for Strategic alliance-Correlation

Correlation		Type of Activity	Strengthen product portfolio	Launch new brands abroad	Launch new products
Pearson Correlation	Type of Activity	1.000	.343	.280	.066
	P-Strengthen product portfolio	.343	1.000	.637	.278
	P-Launch new brands abroad	.280	.637	1.000	.302
	P-Launch new products	.066	.278	.302	1.000
Sig. (2-tailed)	Type of Activity	.	.002	.008	.291
	P-Strengthen product portfolio	.002	.	.000	.009
	P-Launch new brands abroad	.008	.000	.	.005
	P-Launch new products	.291	.009	.005	.

A correlation for the data revealed that, *There is moderate correlation between*

- *strategic alliance formation between Indian and foreign pharmaceutical companies and the need to strengthen product portfolio, r = .343, N = 73, p < .01, 2- tail.*
- *strategic alliance formation between Indian and foreign pharmaceutical companies pharmaceutical companies and the need to launch new products abroad, r = .283, N = 73, p < .01, 2- tail.*
- *launching new products domestically and enhancing product portfolio, r = .278, N = 73, p < .01, 2- tail. There was a moderate correlation between launching new products domestically and launching new products abroad, r = .302, N = 73, p < .01, 2- tail.*

There is no correlation between strategic alliance formation between Indian and foreign pharmaceutical companies and launching new products in domestic market, r = .066, N = 73, p < .01, 2- tail.

There is a significant correlation between launching new products abroad and enhancing product portfolio, r = .637, N = 73, p < .01, 2- tail.

Table 38 c Product Related Reasons for Strategic alliance-Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.355[a]	.126	.088	1.159	.126	3.314	3	69	.025

Model Coefficients		Un standardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.547	.836		.654	.515
	P- Strengthen product portfolio	.389	.202	.283	1.924	.058
	P-Launch new brands abroad	.151	.195	.115	.773	.442
	P-Launch new products	-.084	.210	-.048	-.400	.690

When product related factors for the formation of strategic alliances between Indian and foreign pharmaceutical companies was predicted, it was found that need to strengthen product portfolio(β=0.283, p>0.05) need to launch new brands abroad (β = 0.115,p>0.05) and

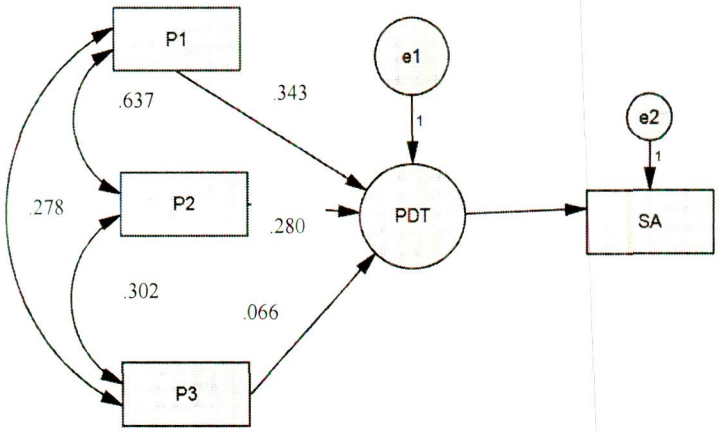
need to launch new products in domestic market (β= -0.048, p>0.05) were not significant predictors.

The overall model fit was R^2 = 0.126

Illustration 09 : Product Related Reasons for Strategic Alliances

The overall model fit was $R^2 = 0.126$.

P1-Strengthen product portfolio
P2-Launch new brands abroad
P3-Launch new products



Thus the linear equation can be represented as :

Y1=.389(P1)+.151(P2)-.084(P3) +.547

5.10.2: Strategic Alliance and Marketing Related Reasons

Table 39a Test statistics– Marketing Related Reasons for Strategic Alliances

	Mean	Std. Deviation	N
Annual Turnover	2.88	1.190	73
Marketing-Global emerging markets	3.8356	.62391	73
Marketing-Regulated markets	3.9452	.76177	73
Marketing-Distribution channels abroad	3.7671	.71726	73

Table 39b Marketing Related Reasons for Strategic Alliances- Correlation

Correlation		Annual Turnover	M-Global emerging markets	M-Regulated markets	Mar-Distribution channels abroad
Pearson Correlation	Annual Turnover	1.000	.328	.345	.259
	M-Global emerging markets	.328	1.000	.507	.379
	M-Regulated markets	.345	.507	1.000	.408

	M-Distribution channels abroad	.259	.379	.408	1.000
Sig. (2-tailed)	Annual Turnover	.	.002	.001	.013
	M-Global emerging markets	.002	.	.000	.000
	M-Regulated markets	.001	.000	.	.000
	M-Distribution channels abroad	.013	.000	.000	.

A correlation for the data revealed that, there is a moderate correlation between

- *strategic alliance formation between Indian and foreign pharmaceutical companies and the need to access the global emerging markets, $r = .328$, $N = 73$, $p < .05$, 2- tail.*
- *strategic alliance formation between Indian and foreign pharmaceutical companies and need to access the global regulated markets, $r = .345$, $N = 73$, $p < .05$, 2- tail.*
- *strategic alliance formation between Indian and foreign pharmaceutical companies and need to access distribution channels abroad, $r = .259$, $N = 73$, $p < .05$, 2- tail.*

There is a significant correlation between

- *accessing global emerging markets and accessing global regulated markets, $r = .507$, $N = 73$, $p < .01$, 2- tail.*
- *accessing global emerging markets and accessing distribution channels abroad, $r = .379$, $N = 73$, $p < .01$, 2- tail.*
- *accessing distribution channels abroad and accessing global regulated markets, $r = .408$, $N = 73$, $p < .01$, 2- tail.*

Table 39c Marketing Related Reasons for Strategic Alliances-Model Summary

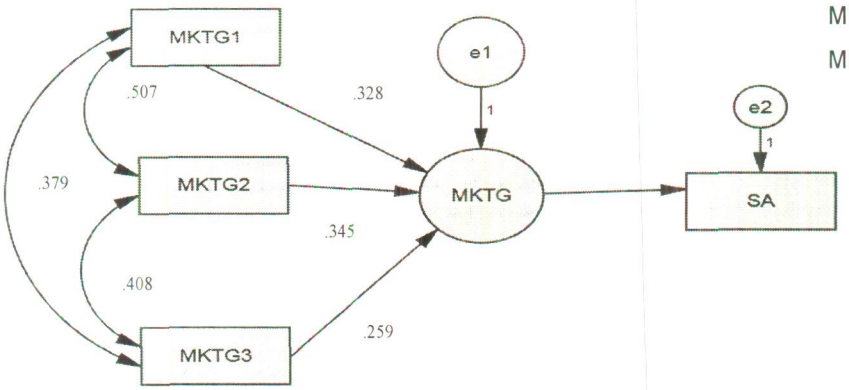
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.399[a]	.159	.123	1.114	.159	4.352	3	69	.007

Model coefficients		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.399	.941		-.424	.673
	M-Global emerging markets	.347	.250	.182	1.386	.170
	M-Regulated markets	.328	.208	.210	1.580	.119
	M-Distribution channels abroad	.173	.206	.104	.840	.404

When Marketing related factors for the formation of strategic alliances between Indian and foreign pharmaceutical companies was predicted, it was found that need to access global emerging markets (β=0.182, p>0.05) need to access regulated markets (β = 0.210, p>0.05) and need to launch distribution channels abroad (β= 104, p>0.05) were not significant predictors.

The overall model fit is R^2 = 0.159.

Illustration 10 : Marketing Related Reasons for Strategic Alliances



MKTG1 -Global emerging markets
MKTG2-Regulated markets
MKTG3-Distribution channels abroad

The overall model fit was R^2 = 0.159. Thus the linear equation can be represented as :

Y2=.347(MKTG1) +.328(MKTG2) +.173(MKTG3) -.399

5.10.3: Strategic Alliance and Technology Related Reasons

Table 40a Test statistics– Technology Related Reasons for Strategic Alliances

	Mean	Std. Deviation	N
Type of Company	2.23	1.219	73
Technology-Access new technology	3.3288	.64668	73
Technology-Collaborative R&D	3.3014	.90806	73
Technology-USFDA approvals	3.1781	.93307	73

Table 40b Technology Related Reasons for Strategic Alliances- Correlation

Correlations		Type of Company	T-Access new technology	T-Collaborative R&D	T-USFDA approvals
Pearson Correlation	Type of Company	1.000	.025	.300	.134
	T-Access new technology	.025	1.000	.113	.477
	T-Collaborative R&D	.300	.113	1.000	.247
	T-USFDA approvals	.134	.477	.247	1.000

Sig. (2-tailed)	Type of Company	.	.417	.005	.129
	T-Access new technology	.417	.	.171	.000
	T-Collaborative R&D	.005	.171	.	.017
	T- USFDA approvals	.129	.000	.017	.

A correlation for the data revealed that, *there is no significant correlation between*

- *strategic alliance formation between Indian and foreign pharmaceutical companies and the need to access new technology, $r = .025$, $N = 73$, $p > .05$, 2- tail.*
- *accessing new technology and collaborative R&D, $r = .113$, $N = 73$, $p < .01$, 2- tail.*

There is a moderate correlation between

- *strategic alliance formation between Indian and foreign pharmaceutical companies and the need for collaborative R&D, $r = .300$, $N = 73$, $p < .05$, 2- tail.*
- *strategic alliance formation between Indian and foreign pharmaceutical companies and need the for USFDA approved facilities, $r = .134$, $N = 73$, $p > .05$, 2- tail.*
- *collaborative R&D and the need to access USFDA approved facility, $r = .247$, $N = 73$, $p < .01$, 2- tail.*
- *There is a significant correlation between USFDA approved facility and need to access new technology, $r = .477$, $N = 73$, $p < .01$, 2- tail.*

Table 40c Technology Related Reasons for Strategic Alliances- Model Summary

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.309[a]	.095	.056	1.185	.095	2.424	3	69	.073

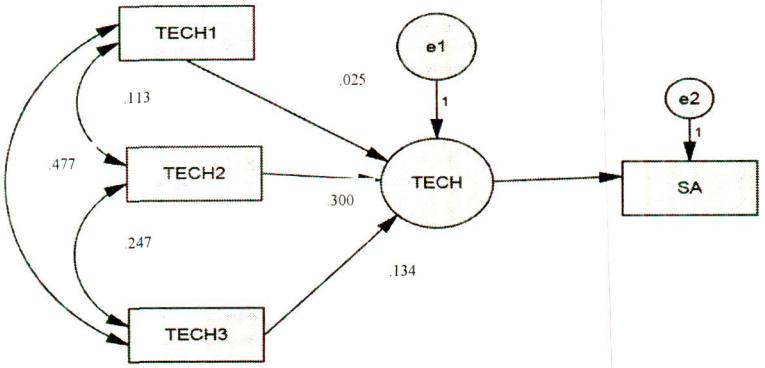
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.920	.850		1.082	.283
	T- Access new technology	-.092	.246	-.049	-.373	.710
	T-Collaborative R&D	.381	.159	.283	2.399	.019
	T-USFDA approvals	.114	.175	.087	.652	.517

When Technology related factors for the formation of strategic alliances between Indian and foreign pharmaceutical companies was predicted, it was found that need to access new

technology (β=-0.049, p>0.05) and the need for USFDA approved facilities (β = .087,p>0.05) were not significant predictors. However Collaborative R&D (β=.283 , p< 0.05) is a significant predictor.

The overall model fit was $R^2 = 0.095$

Illustration 11: Technology Related Reasons for Strategic Alliances



TECH1 -Access new technology
TECH2-Collaborative R&D
TECH3-USFDA approvals

The overall model fit was $R^2 = 0.095$. Thus the linear equation can be represented as:

Y3=.381(TECH2) +.114(TECH3) -.092(TECH1) +.920

5.10.4: Strategic Alliance and Manufacturing Related Reasons

Table 41a Test statistics– Manufacturing Related Reasons for Strategic Alliances

	Mean	Std. Deviation	N
Annual Turnover	2.88	1.190	73
Manufacturing-Cost minimization	2.9178	.90911	73
Manufacturing-Common assets	2.8630	.91765	73
Manufacturing-Quality management	3.2877	.67658	73

Table 41b - Manufacturing Related Reasons for Strategic Alliances- Correlation

Correlations		Annual Turnover	M-Cost minimization	M-Common assets	M-Quality management
Pearson Correlation	Annual Turnover	1.000	-.138	.162	-.162
	Manufacturing-Cost minimization	-.138	1.000	.419	.220
	Manufacturing-Common assets	.162	.419	1.000	.221

	Manufacturing-Quality management	-.162	.220	.221	1.000
Sig. (2-tailed)	Annual Turnover	.	.122	.085	.085
	Manufacturing-Cost minimization	.122	.	.000	.031
	Manufacturing-Common assets	.085	.000	.	.030
	Manufacturing-Quality management	.085	.031	.030	.

A correlation for the data revealed that,

There is no significant correlation between

- *strategic alliance formation between Indian and foreign pharmaceutical companies and the need to minimise manufacturing costs, r = -.138 , N = 73, p > .05, 2- tail,*
- *strategic alliance formation between Indian and foreign pharmaceutical companies the need to optimise common assets, r = .162 , N = 73, p > .05, 2- tail,*
- *strategic alliance formation between Indian and foreign pharmaceutical companies the need for quality management processes, r = .162, N = 73, p >.05, 2- tail.*

There is a significant correlation between cost minimisation and optimising common assets factors , r = .419, N = 73, p < .01, 2- tail.

There is a moderate correlation between

- *cost minimisation and the need for quality management processes, r=.220 , N = 73, p < .01, 2- tail*
- *optimising common assets and the need for quality management processes, r = .221, N = 73, p < .01, 2- tail*

Table 41c - Manufacturing Related Reasons for Strategic Alliances- Model Summary

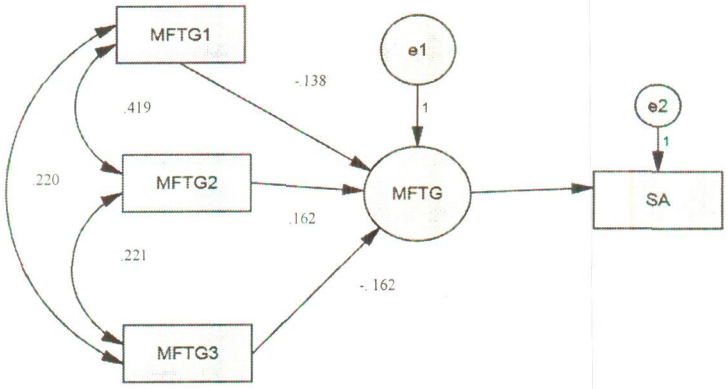
					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.328	.108	.069	1.148	.108	2.775	3	69	.048

	Unstandardized Coefficients		Standardized Coefficients		
Model	B	Std. Error	Beta	t	Sig.

1	(Constant)	3.664	.756		4.845	.000
	Manufacturing-Cost minimization	-.291	.166	-.222	-1.757	.083
	Manufacturing-Common assets	.383	.164	.295	2.331	.023
	Manufacturing-Quality management	-.314	.207	-.179	-1.517	.134

When Manufacturing related factors for the formation of strategic alliances between Indian and foreign pharmaceutical companies were predicted, it was found that Cost optimization (β= -.222, p> 0.05) and Quality management (β= -.179, p>0.05) are not significant predictors. However need to optimize common assets (β=-0.295, p<0.05) was a significant predictor. The overall model fit was R^2 = 0.108

Illustration 12 : Manufacturing Related Reasons for Strategic Alliances



Y4= -.291(MFTG1) + .383(MFTG2) - 314(MFTG3) + .3.66

5.10.5: Competitive Advantage Related

Table 42a Test *statistics–Competitive Advantage Related Reasons for Strategic Alliances*

	Mean	*Std. Deviation*	*N*
Type of Activity	2.16	1.214	73
Competitive Advantage-Market position	3.9178	.72175	73
Competitive Advantage-Financial power	3.9863	.69708	73
Competitive Advantage-Image	4.0411	.71567	73

Table 42b *Competitive Advantage Related Reasons for Strategic Alliances- Correlation*

Correlations		Type of Activity	Competitive Advantage- Market position	Competitive Advantage- Financial power	Competitive Advantage- Image
Pearson Correlation	Type of Activity	1.000	.063	.315	.296
	CA-Market position	.063	1.000	.301	.410
	CA-Financial power	.315	.301	1.000	.391
	CA-Image	.296	.410	.391	1.000
Sig. (2-tailed)	Type of Activity	.	.298	.003	.006
	CA-Market position	.298	.	.005	.000
	CA-Financial power	.003	.005	.	.000
	CA-Image	.006	.000	.000	.

A correlation for the data revealed that,

There is no significant correlation between

- *strategic alliance formation between Indian and foreign pharmaceutical companies and the need to enhance market position, $r = .063$, $N = 73$, $p > .05$, 2- tail.*
- *strategic alliance formation between Indian and foreign pharmaceutical companies and the need to enhance company image, $r = .296$, $N = 73$, $p < .05$, 2- tail.*

There is moderate correlation between

- *strategic alliance formation between Indian and foreign pharmaceutical companies and the need to enhance financial power, $r = .315$, $N = 73$, $p < .05$, 2- tail.*

There is a significant correlation between

- *the need for enhancing market position and create financial presence, $r = .301$, $N = 73$, $p < .01$, 2- tail.*
- *the need for enhancing market position and enhance corporate image, $r = .410$, $N = 73$, $p < .01$, 2- tail.*
- *the need for enhancing corporate image and attaining financial capability, $r = .391$, $N = 73$, $p < .01$, 2- tail.*

Table 42c *Competitive Advantage Related Reasons for Strategic Alliances-Model Summary*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.380[a]	.145	.107	1.146	.145	3.889	3	69	.013

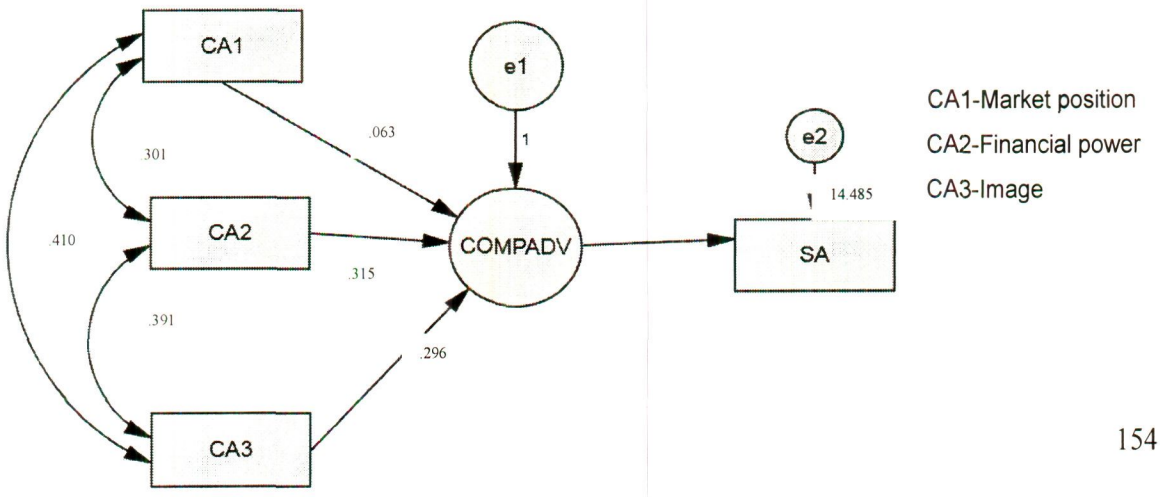
Model		Un standardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.518	1.005		-.515	.608
	CA -Market position	-.190	.208	-.113	-.912	.365
	CA- Financial power	.442	.214	.254	2.067	.042
	CA-Image	.412	.218	.243	1.895	.062

When Competitive Advantage related factors for the formation of strategic alliances between Indian and foreign pharmaceutical companies was predicted, it was found that achieving Market position (β= -.113 , p> 0.05) and enhancing Company image (β= .243, p>0.05) are not significant predictors.

However the need to achieve financial power (β=-0.254 , p<0.05) was a significant predictor.

The overall model fit was $R^2 = 0.145$

Illustration 13 : Competitive Advantage related reasons for Strategic Alliances



The overall model fit was $R^2 = 0.145$. Thus the linear equation can be represented as:

Y5= -.190(CA1) + .442(CA2)+.412(CA3) - .518

5.11. Correlation between the Strategic Alliances and Business Implication

5.11.1 Strategic Alliance and Implication on Products

Table 43a Test statistics– Implications of Strategic Alliance on Products

	Mean	Std. Deviation	N
Annual Turnover	2.88	1.190	73
Products-New patents	3.3151	.86405	73
Products-New generics abroad	3.6301	.92055	73
Products-New generics domestic	3.4658	.83470	73
Products-Wide portfolio	3.8630	.67320	73

Table 43b Implications of Strategic Alliance on Products- Correlation

Correlation		Annual Turnover	Products-New patents	Products-New generics abroad	Products-New generics domestic	Products-Wide portfolio
Pearson Correlation	Annual Turnover	1.000	.403	.452	.324	.187
	Products-New patents	.403	1.000	.358	.448	.410
	Products-New generics abroad	.452	.358	1.000	.607	.388
	Products-New generics domestic	.324	.448	.607	1.000	.436
	Products-Wide portfolio	.187	.410	.388	.436	1.000
Sig. (2-tailed)	Annual Turnover	.	.000	.000	.003	.057
	Products-New patents	.000	.	.001	.000	.000
	Products-New generics abroad	.000	.001	.	.000	.000
	Products-New generics domestic	.003	.000	.000	.	.000
	Products-Wide portfolio	.057	.000	.000	.000	.

A correlation for the data revealed that, There is no significant correlation between strategic alliances between Indian and foreign pharmaceuticals and widening their product portfolio, $r = .187$, $N = 73$, $p > .05$, 2- tail.

There is moderate correlation between

- *strategic alliances between Indian and foreign pharmaceutical companies and launching new generics in domestic market, $r = .324$, $N = 73$, $p < .05$, 2- tail.*
- *New patents and launching new generics in foreign market, $r = .358$, $N = 73$, $p < .05$, 2- tail.*
- *gaining Wide portfolio and launching new generics in foreign market, $r = .388$, $N = 73$, $p < .05$, 2- tail.*

There is significant correlation between

- *strategic alliances between Indian and foreign pharmaceutical companies and launching new generics in the foreign market, $r = .452$, $N = 73$, $p < .05$, 2- tail.*
- *strategic alliances between Indian and foreign pharmaceutical companies and launch new patents, $r = .403$, $N = 73$, $p < .05$, 2- tail.*
- *launching New patents and Launching new generics in the domestic market, $r = .448$, $N = 73$, $p < .05$, 2- tail.*
- *New patents and Product portfolio enhancement, $r = .410$, $N = 73$, $p < .05$, 2- tail.*

Table 43c Implications of Strategic Alliance on Products-Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.526[a]	.277	.234	1.041	.277	6.503	4	68	.000

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	.302	.770		.392	.696
	Products-Newpatents	.418	.165	.304	2.529	.014
	Products-New generics abroad	.490	.171	.379	2.870	.005
	Products-New generics domestic	-.009	.198	-.006	-.044	.965
	Products-Wide portfolio	-.145	.212	-.082	-.682	.498

When implication of strategic alliance on product related factors alliances between Indian and foreign pharmaceutical companies was predicted, it was found that need to achieve launching new patented products (β=-0.304 , $p<0.05$) and launching new generics in the foreign market (β= .379 , $p> 0.05$) were significant predictors.

However Launching new generics in domestic market (β= -.006, $p> 0.05$) and enhancing Product portfolio (β= -.082, $p>0.05$) are not significant predictors.

The overall model fit was $R^2 = 0.277$

5.11.2 Strategic Alliance and Implication on Marketing

Table 44a Test statistics– Implications of Strategic Alliance on Marketing

	Mean	Std. Deviation	N
Type of Activity	2.16	1.214	73
Marketing-Regulated market	3.6986	.66007	73
Marketing-Investment capability	3.8082	.73895	73
Marketing-Foreign distribution	3.7397	.76426	73

Table 44b Implications of Strategic Alliance on Marketing- Correlation

		Type of Activity	Marketing-Regulated market	Marketing-Investment capability	Marketing-Foreign distribution
Pearson Correlation	Type of Activity	1.000	.305	.423	.466
	Marketing-Regulated market	.305	1.000	.364	.448
	Marketing-Investment capability	.423	.364	1.000	.451
	Marketing-Foreign distribution	.466	.448	.451	1.000

Sig. (2-tailed)	Type of Activity	.	.004	.000	.000
	Marketing-Regulated market	.004	.	.001	.000
	Marketing-Investment capability	.000	.001	.	.000
	Marketing-Foreign distribution	.000	.000	.000	.

A correlation for the data revealed that,

There is moderate correlation between strategic alliances between Indian and foreign pharmaceutical companies and their entry into regulated markets, r = .305 , N = 73, p <.05, 2- tail.

There is strong correlation between

- *strategic alliances between Indian and foreign pharmaceutical companies their enhanced investment capability, r = .423, N = 73, p<.05, 2- tail.*
- *strategic alliances between Indian and foreign pharmaceutical companies and accessing foreign distribution channel, r = .466, N = 73, p < .01, 2- tail.*
- *Entry to regulated markets and enhanced access to foreign distribution channels, r = .448, N = 73, p < .01, 2- tail.*
- *Enhanced investment capability and enhanced access to foreign distribution channels , r = .451, N = 73, p < .01, 2- tail.*

There is moderately significant correlation between enhanced investment capability and access to regulated markets, r=.364,N=73,p<.01, 2- tail.

Table 44c Implications of Strategic Alliance on Marketing- Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.527[a]	.278	.246	1.054	.278	8.841	3	69	.000

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.795	.843		-2.128	.037
	Mk-Regulated market	.128	.215	.070	.597	.552
	Mk-Investment capability	.415	.192	.253	2.158	.034
	Mk-Foreign distribution	.509	.194	.321	2.629	.011

When implication of strategic alliance on product related factors alliances between Indian and foreign pharmaceutical companies was predicted, it was found that increase in investment capability (β=-0.253 , $p<0.05$) and access to foreign distribution network market (β= .321 , $p< 0.05$) were significant predictors.

However access to regulated market (β= .07, $p> 0.05$) is not a significant predictor.

The overall model fit was $R^2 = 0.278$

5.11.3 Strategic Alliance and Implication on Technology

Table 45 a Test statistics–Implications of Strategic Alliance on Technology

	Mean	Std. Deviation	N
Type of Company	2.23	1.219	73
Technology-New technology	3.3562	.85586	73
Technology-R&D capability	3.0959	1.05626	73
Technology-GMP compliance	3.4932	.80144	73
Technology-Access to information	3.6164	.77514	73

Table 45b Implications of Strategic Alliance on Technology- Correlation

		Type of Company	T-New technology	T-R&D capability	T-GMP compliance	T-Access to information
Pearson Correlation	Type of Company	1.000	.132	.295	.250	.463
	Technology-New technology	.132	1.000	.423	.388	.334
	Technology-R&D capability	.295	.423	1.000	.567	.470
	Technology-GMP compliance	.250	.388	.567	1.000	.510
	Technology-Access to information	.463	.334	.470	.510	1.000
Sig. (2-tailed)	Type of Company	.	.132	.006	.016	.000
	Technology-New technology	.132	.	.000	.000	.002
	Technology-R&D capability	.006	.000	.	.000	.000
	Technology-GMP compliance	.016	.000	.000	.	.000
	Technology-Access to information	.000	.002	.000	.000	.

A correlation for the data revealed that,

There is no correlation between strategic alliances between Indian and foreign pharmaceutical companies and their access to new technologies, $r = .132$, $N = 73$, $p > .05$, 2-tail.

There is moderate correlation between

- *pharmaceutical companies with differing activities and enhanced R&D capabilities, r = .295, N = 73, p <.05, 2- tail.*
- *strategic alliances between Indian and foreign pharmaceutical companies and acquiring GMP compliant manufacturing facilities , r = .250, N = 73, p <.05, 2- tail*

Table 45c Implications of Strategic Alliance on Technology- Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.475[a]	.226	.180	1.104	.226	4.951	4	68	.001

There is strong correlation between

- *strategic alliances between Indian and foreign pharmaceutical companies and their enhanced access to information, r = .463, N = 73, p <.05, 2- tail*
- *Accessing new technology and enhanced R&D capabilities, r = .423 , N = 73, p <.05, 2- tail.*
- *enhanced R&D capabilities and achieving GMP compliant manufacturing facilities, r = .567 , N = 73, p <.05, 2- tail.*
- *achieving GMP compliant manufacturing facilities and Accessing new information, r = .510 , N = 73, p <.05, 2- tail.*

There is moderate correlation between

- *Accessing new technology and achieving GMP compliant manufacturing facilities , r = .388 , N = 73, p <.05, 2- tail*
- *Accessing new technology and Accessing new information , r = .334 , N = 73, p <.05, 2- tail*

When implication of strategic alliance on technology related factors alliances between Indian and foreign pharmaceutical companies was predicted, it was found that ability to access new information (β=0.433 , $p<0.05$) was significant predictor.

However achieving Accessing new technology (β= -.059, $p> 0.05$) , Achieving R&D capability ((β= .128, $p>0.05$)and accessing GMP compliant facilities (β= -.021, $p>0.05$) are not significant predictors. The overall model fit was $R^2 = 0.226$

5.11.4 Strategic Alliance and Implication on Manufacturing

Table 46a Test statistics– Implications of Strategic Alliance on Manufacturing

	Mean	Std. Deviation	N
Annual Turnover	2.88	1.190	73
Manufacturing-Cost optimization	3.0959	.71033	73
Manufacturing-Common assets	3.0959	.95981	73
Manufacturing-Quality management	3.4521	.70791	73

Table 46b Implications of Strategic Alliance on Manufacturing- Correlation

		Annual Turnover	M- Cost optimization	M-Common assets	M-Quality management
Pearson Correlation	Annual Turnover	1.000	.261	.120	-.164
	Manufacturing-Cost optimization	.261	1.000	.475	.272
	Manufacturing-Common assets	.120	.475	1.000	.487
	Manufacturing-Quality management	-.164	.272	.487	1.000
Sig. (2-tailed)	Annual Turnover	.	.013	.156	.083
	Manufacturing-Cost optimization	.013	.	.000	.010
	Manufacturing-Common assets	.156	.000	.	.000
	Manufacturing-Quality management	.083	.010	.000	.

A correlation for the data revealed that,

There is moderate correlation between strategic alliances between Indian and foreign pharmaceutical companies and Cost optimization, $r = .261$, $N = 73$, $p <.05$, 2- tail.

There is no correlation between

- *strategic alliances between Indian and foreign pharmaceutical companies the need to optimization of common assets, $r = .120$, $N = 73$, $p>.05$, 2- tail.*

- *strategic alliances between Indian and foreign pharmaceutical companies and Quality Management, r = -.164, N = 73, p > .05, 2- tail.*
- *Quality management and Cost optimization among pharmaceutical companies, r=.272, N=73,p< 0.05,2 –tail*

There is a strong correlation between

- *Optimizing common assets and Cost optimization among pharmaceutical companies, r=.475,N=73,p <0.000, 2- tail*
- *Quality management and Optimizing common assets among pharmaceutical companies, r=.487,N=73, p<0.05, 2- tail*

Table 46c Implications of Strategic Alliance on Manufacturing- Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.373[a]	.139	.102	1.127	.139	3.721	3	69	.015

Model		Un standardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.682	.784		3.421	.001
	M-Cost optimization	.467	.213	.279	2.195	.032
	M-Common assets	.169	.174	.137	.975	.333
	M-Quality management	-.514	.215	-.306	-2.390	.020

When implication of strategic alliance on Manufacturing related factors alliances between Indian and foreign pharmaceutical companies was predicted, it was found that need for cost optimization (β=-0.279, p<0.05) was significant predictors.

However achieving Utilization of common assets (β= .137, p> 0.05) and Enhancing Quality management capability ((β= -.306, p<0.05) are not significant predictors. The overall model fit was R^2 = 0.13

5.11.5 Strategic Alliance and Implication Competitive Advantage

Table 47a Test statistics-- Implications of Strategic Alliance on Competitive Advantage

	Mean	Std. Deviation	N
Type of Activity	2.16	1.214	73
CA- Increased market share	3.9178	.74075	73
CA-Increased profits	3.9726	.81603	73
CA-Established new brands	3.8767	.70603	73
CA-Managerial capabilities	3.7260	.73144	73

Table 47b Implications of Strategic Alliance on Competitive Advantage-Correlation

		Type of Activity	CA-Increased market share	CA-Increased profits	Established new brands	CA-MC
Pearson Correlation	Type of Activity	1.000	.154	.229	.300	.255
	CA-Increased market share	.154	1.000	.571	.379	.317
	CA- Increased profits	.229	.571	1.000	.500	.546
	CA-Established new brands	.300	.379	.500	1.000	.472
	CA-Managerial capabilities	.255	.317	.546	.472	1.000
Sig. (2-tailed)	Type of Activity	.	.096	.026	.005	.015
	CA-Increased market share	.096	.	.000	.000	.003
	CA-Increasedprofits	.026	.000	.	.000	.000
	CA-Established new brands	.005	.000	.000	.	.000
	CA-Managerial capabilities	.015	.003	.000	.000	.

A correlation for the data revealed that,

There is no correlation between strategic alliances between Indian and foreign pharmaceutical companies and the need to enhance market position, r = .154, N = 73, p > .05, 2- tail.

There is moderate correlation between

- *strategic alliances between Indian and foreign pharmaceutical companies and the need to increase profits, r = .229, N = 73, p <.05, 2- tail.*
- *strategic alliances between Indian and foreign between pharmaceutical companies and the need to enhance managerial capabilities, r = .255, N = 73, p<.05, 2- tail.*
- *strategic alliances between Indian and foreign pharmaceutical companies and need to establish new brands , r = .300, N = 73, p < .05, 2- tail.*

Table 47c Implications of Strategic Alliance on Competitive Advantage- Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.329[a]	.108	.056	1.179	.108	2.062	4	68	.095

Model		Un standardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.362	.967		-.374	.710
	Competitive Advantage-Increased market share	.007	.231	.005	.032	.974
	Competitive Advantage-Increased profits	.077	.241	.052	.319	.751
	Competitive Advantage-Established new brands	.366	.239	.213	1.536	.129
	Competitive Advantage-Managerial capabilities	.207	.236	.125	.877	.384

When the implication of strategic alliance on Competitive Advantage related factors alliances between Indian and foreign pharmaceutical companies was predicted, it was found that need for establishing new brands (β= 0.213, p>0.05) was moderately significant predictor.

However achieving Increase market shares (β= .005, p> 0.05) and Increase profits ((β= .052, p<0.05) and Enhance Managerial capabilities (β= .236, p> 0.05) are not significant predictors.

The overall model fit was R^2 = 0.108.

5.12. Correlation Between the Strategic Alliances and Identified Hindrances for Strategic Alliances

5.12. *External and Internal Hindrances for strategic alliances between Indian and foreign pharmaceutical companies*

Table 48a Test statistics– External and Internal Hindrances for Strategic Alliance

	Mean	Std. Deviation	N
Annual Turnover	2.88	1.190	73
External Hindrances-Information	3.3836	.98079	73
External Hindrances-Govt. policies	3.5205	.80121	73
Internal Hindrances-Unclear objectives	3.3425	.73066	73
Internal Hindrances-Lack of communication	3.7123	.73559	73
Internal Hindrances-Non monitoring of alliance	3.6849	.66409	73
Internal Hindrances-Lack of trust	3.7945	.79859	73

Table 48b External and Internal Hindrances for Strategic Alliance- correlation

		Annual Turnover	E-Information	E-Govt policies	I-Unclear objective	I-Lack of communication	I-Non monitoring of alliance	I-Lack of trust
Pearson Correlation	Annual Turnover	1.000	-.126	-.063	.193	.102	-.243	-.012
	E- Information	-.126	1.000	.679	.085	.251	.060	.084
	E-Govt. policies	-.063	.679	1.000	.071	.187	.130	.191
	I-Unclear objectives	.193	.085	.071	1.000	.625	.397	.241
	I-Lack of communication	.102	.251	.187	.625	1.000	.381	.465
	I-Non monitoring of alliance	-.243	.060	.130	.397	.381	1.000	.531
	I-Lack of trust	-.012	.084	.191	.241	.465	.531	1.000
Sig. (2-tailed)	Annual Turnover	.	.145	.299	.051	.196	.019	.458
	E-Information	.145	.	.000	.236	.016	.307	.239
	E-Govt. policies	.299	.000	.	.276	.057	.137	.053
	I-Unclear objectives	.051	.236	.276	.	.000	.000	.020
	I-Lack of communication	.196	.016	.057	.000	.	.000	.000
	I-Non monitoring of alliance	.019	.307	.137	.000	.000	.	.000
	I-Lack of trust	.458	.239	.053	.020	.000	.000	.

A correlation for the data revealed that, There is a no significant correlation between

- *strategic alliances between Indian and foreign pharmaceutical companies and external hindrance namely lack of information, r = -.126 , N = 73, p > .05, 2- tail.*
- *strategic alliance between Indian and foreign pharmaceutical companies and external hindrance namely government policies, r = -.063, N = 73, p >.05, 2- tail.*
- *strategic alliances between Indian and foreign pharmaceutical companies and internal hindrance of unclear objectives, r = .193, N = 73, p >.05, 2- tail.*

- *strategic alliance between Indian and foreign pharmaceutical companies and internal hindrance of lack of communication, r = .102, N = 73, p >.05, 2- tail.*
- *strategic alliance between Indian and foreign pharmaceutical companies and internal hindrance of non monitoring of alliance, r = -.243, N = 73, p <.05, 2- tail.*
- *between strategic alliance between Indian and foreign pharmaceutical companies pharmaceutical companies and internal hindrance of lack of trust, r = -. 012, N = 73, p >.05, 2- tail.*

Table 48c External and Internal Hindrances for Strategic Alliance- Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.445[a]	.198	.125	1.113	.198	2.715	6	66	.020

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.526	.976		3.613	.001
	Ext-Information	-.242	.188	-.200	-1.289	.202
	Ext-Govt. policies	.111	.228	.075	.489	.626
	Int-Unclear objectives	.530	.241	.326	2.197	.032
	Int-Lack of communication	.076	.260	.047	.292	.771
	Int-Non monitoring of alliance	-.822	.247	-.459	-3.330	.001
	Int-Lack of trust	.199	.212	.133	.935	.353

When External Hindrances to strategic alliance was predicted, it was found that need for lack of information (β= -0.200 , p>0.05) and Government policies (β=-0.075 , p>0.05) are not significant predictor.

When Internal Hindrances to strategic alliance was predicted, it was found that Unclear Objectives (β= .326 , p< 0.05) is a significant predictor.

However, Lack of communication (β= .047 , p>0.05), and Lack of Trust (β= . 133 , p> 0.05) are not significant factors .

Non monitoring of alliance (β= -.459 , p< 0.05) has a strong negative correlation.

5.13. Summary: Correlation

a. *Factors that influence Indian pharmaceutical companies to form strategic alliances with foreign pharmaceutical firms.*

Table 49 – Summary of Reasons for Strategic Alliances

Factors	Variables	Correlation	Influence	R square
Product	Strengthen product portfolio	.343	Moderate	.126
	Establish brands abroad	.280	Moderate	
	Launch new products	.066	Low	
Marketing	Global emerging markets	.328	Moderate	.159
	Regulated markets	.345	Moderate	
	Distribution channels abroad	.259	Moderate	
Technology	Access new technology	.025	Low	.095
	Collaborative R&D	.300	Moderate	
	USFDA approvals	.134	Low	
Manufacturing	Cost minimization	-.138	Low	.108
	Common assets	.162	Low	
	Quality management	-.162	Low	
Competitive Advantage	Market position	.063	Low	.145
	Financial power	.315	Moderate	
	Image	.296	Moderate	

b. *Impact of the strategic alliances between Indian and foreign pharmaceutical companies on various business aspects of the Indian pharmaceutical firm.*

Table 50 – Summary of Implications of Strategic Alliances

Factors	Variables	Correlation	Impact	R square
Product	New patents	.403	High	.277
	New generics abroad	.452	High	
	New generics domestic	.324	Moderate	
	Wide portfolio	.187	Low	
Marketing	Regulated market	.305	Moderate	.278
	Investment capability	.423	High	
	Foreign distribution	.466	High	
Technology	New technology	.132	Low	.226
	R&D capability	.295	Moderate	
	GMP compliance	.250	Moderate	
	Access to information	.463	High	
Manufacturing	Cost optimization	.261	Moderate	.139

	Common assets	.120	Low	
	Quality management	-.164	Low	
Competitive Advantage	Increased market share	.154	Low	.108
	Increased profits	.229	Moderate	
	Established new brands	.300	Moderate	
	Managerial capabilities	.255	Moderate	

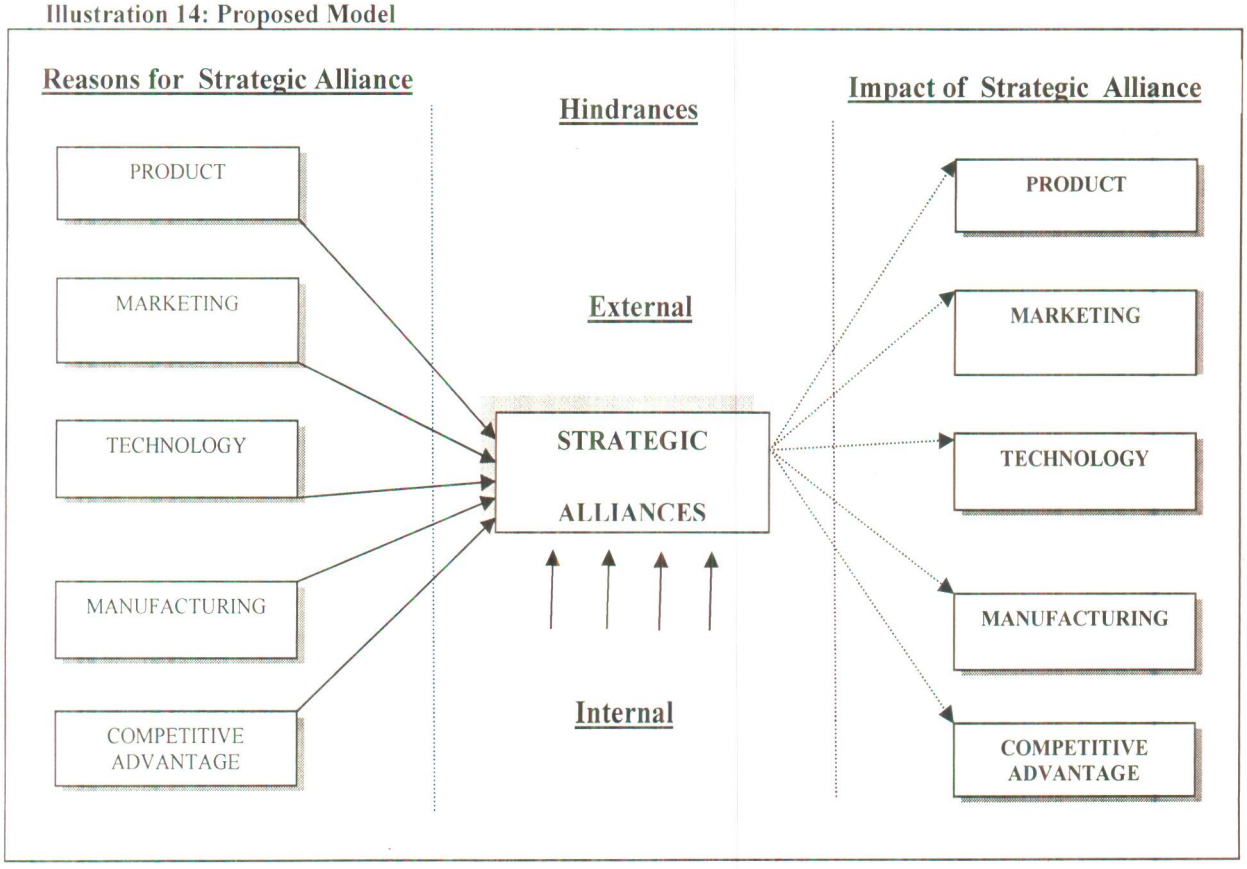
c. *External and Internal hindrances for the formation of strategic alliances between Indian and foreign pharmaceutical companies.*

Table 51 – Summary of Hindrances for Strategic Alliance

Factors	Variables	Correlation	Impact	R square
External	Information	-.126	Negative	.198
	Govt. policies	-.063	Negative	
	Unclear objectives	.193	Low	
Internal	Lack of communication	.102	Low	
	Non monitoring of alliance	-.243	Negative	
	Lack of trust	-.012	Negative	

5.14. Proposed Model for Strategic Alliance between Indian and Foreign Pharmaceutical Companies

Illustration 14: Proposed Model



The model depicts three aspects, the reasons for strategic alliance between Indian and foreign pharmaceutical companies, the impact of the alliance on business and the factors that hinder the formation and success of the alliances. All the five factors namely, product, marketing, technology, manufacturing and competitive advantage play a role in the formation of strategic alliances between Indian and foreign pharmaceutical companies. The level of influence is dependent on the type of company, its activities and business objectives of growth. Positive impact of strategic alliances between Indian and foreign pharmaceutical companies is observed on various aspects of the business namely, product, marketing, technology, manufacturing and competitive advantage. The impact of the alliances would depend on the focus of the company going for the alliance. The model depicts the influence of factors both external and internal which can prove to be hindrance for the success of the strategic alliance between Indian and foreign pharmaceutical companies

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

CHAPTER 6: CONCLUSIONS, RECOMMENDATIONS AND DIRECTIONS FOR FUTURE RESEARCH

6.1 Conclusions for the Main Research Problem

After analyzing the primary data, the following conclusions can be drawn with reference to reasons for strategic alliances, impact of strategic alliances and the hindrances for strategic alliance between Indian and foreign pharmaceutical companies. However the expected outcome of these factors differs from company to company.

6.1.1 Conclusions Relating to Reasons for Strategic Alliance between Indian and Foreign Pharmaceutical Companies:

- *Strengthen product portfolio*

This research work has indicated that for Indian pharmaceutical companies a driving factor for the formation of Strategic alliances between Indian and foreign pharmaceutical companies is the need to strengthen the existing product portfolio of Indian companies. *Mueller (2007)* had identified this as a reason for strategic alliances among pharmaceutical companies. Dr. Reddy's which started off as an API and bulk drugs manufacturing company is foraying today into the biosimilar segments, with an alliance with Merck Serono to co develop new molecules for the oncology segment.

- *Establish new brands abroad*

Primary research indicates that Indian pharmaceutical companies look at strategic alliances with foreign pharmaceutical companies, to establish their products and brands in the foreign market. This is also substantiated by *Pradhan (2007)*. Ipca has entered into a strategic alliance

with Heritage Pharmaceuticals (USA) for the development, supply and marketing of generic pharmaceutical products to the US prescription drug market.

- *Launch new product lines*

Research indicates that Indian companies seek alliances with foreign pharmaceutical firms to enable them launch new products in the market. Alliances help companies launch product faster to meet the growing demands. Panacea Biotech's alliance with Kremers Urban (USA) includes launch of 11 high barrier generic compounds, the first one being Tacrolimus capsules.

- *Enter global emerging markets*

Expanding the market by entering new emerging markets is a strong driver for Indian pharmaceutical companies to form strategic alliances with foreign pharmaceutical companies. *Pradhan (2007), Parvatiyar and Gupta(199$), Smith (2000)* have indicated this to be a key reason for staretgic alliances. Indoco Remedies and Aspen have inked an alliance to supply of ophthalmic products for 30emerging markets in 2012. Dr Reddy's and GSK have entered into an alliance to develop & market branded generics for emerging market

- *Enter regulated markets*

Indian pharmaceutical companies consider entry into regulated market like US, UK, European Union as the third most important reason which drives strategic alliances between Indian and foreign pharmaceutical companies. This is also evidenced by the fact that many Indian pharmaceutical companies have acquired pharmaceutical companies in the desired markets and created their own subsidiaries. Cipla's alliance with Watson pharma (USA) focused on 60 generic products to be developed and launched in the US market.

- *Establish distribution channels abroad*

The need to establish new distribution channels in foreign market which will eventually help in marketing the products, drives strategic alliances between Indian and foreign pharmaceutical companies. *Parvatiyar and Gupta(1994)* have established this as a key reason for alliances.

- *Access new technology*

Research indicates that Indian pharmaceutical companies consider gaining access to new technology as a reason that can drive strategic alliances between Indian and foreign pharmaceutical companies. *Greene(2007), Smith (2000),Chaturvedi and Chataway(2006)*, concluded that one of the key motivators for strategic alliances between firms is to access new technology.

- *Undertake collaborative R&D*

Indian companies consider collaborative R&D as a driver for strategic alliances between Indian and foreign pharmaceutical companies. *Narula and Dunning (1998),* have indicated that collaborative R&D encourages Alliances. However this reason may not hold good for all Indian pharmaceutical companies, as R&D costs in India are much lower and not all Indian pharmaceutical companies have the orientation towards R&D. DRL has launched a drug discovery program by creation Dr. Reddy's Research Foundation in 1992, to boost R&D. The first NCE that came out of India was a molecule called DRF- 2725, which was licensed out to Nova Nordisk for trials and was launched in 2011.

- *Obtain USFDA approved manufacturing facilities*

Pharmaceutical companies in India look at strategic alliances with foreign pharmaceutical companies to gain access to USFDA approved manufacturing facilities. Although *Greene (2007)and Pradhan and Abraham (2005)* indicated this to be a driver, it is s not a very strong driving force among Indian pharmaceutical companies and may be limited to firm specific driver.

- *Cost minimization*

Research indicates that cost minimization is a factor that can influence the formation of strategic alliances between Indian and foreign pharmaceutical companies. However not all pharmaceutical companies consider this to be a driving factor especially with reference to the Indian pharmaceutical companies.

- *Achieve operational synergy*

Achieving operational synergy may be a reason for strategic alliances between two firms, however with respect to Indian and foreign pharmaceutical companies, this is not a strong driving factor for Indian pharmaceutical companies to look at strategic alliances with foreign pharmaceutical companies.

- *Achieve quality management*

Gaining knowledge on quality related aspects and managing overall quality is a driver for strategic alliances. However with respect to Indian pharmaceutical companies, this is not a very critical driver for strategic alliances with foreign pharmaceutical companies.

- *Achieve market position*

This research has indicated that achieving high market position is a key factor which drives Indian pharmaceutical companies to form strategic alliances with foreign pharmaceutical companies. This also stems from the fact that achieving high market position is a growth objective of a company, and strategic alliances can help achieve high growth objectives. Companies like Ranbaxy, Piramal lifescience, Glenmark, Sun Pharma, DRL, APL and Lupin have achieved high market positions over the years

- *Achieve financial power*

The need to have adequate financial power through high profits is a strong driver for Indian pharmaceutical; companies to form strategic alliances with foreign pharmaceutical companies. Cipla and Ranbaxy have become top pharmaceutical companies in India thanks to many alliances which has helped them gain higher sales turnover, which has helped them gather high financial power.

- *Enhance company image*

This research indicates that Indian pharmaceutical companies feel that the primary reason for strategic alliances between Indian and foreign pharmaceutical companies is the need to enhance the company image and score on competitive advantage. This will eventually influence the profitability and stocks of the Indian pharmaceutical companies.

6.1.2 Conclusions Relating to Impact of Strategic Alliance

Analysis of the primary data from Indian pharmaceutical companies indicate that strategic alliances between Indian and foreign companies has a direct impact on new patent filing and new product launches from Indian pharmaceutical companies.

- *Strategic alliances and introduction of new patents from Indian pharmaceutical companies*

The response from the Indian companies indicates that there is a strong impact of strategic alliances with foreign pharmaceutical companies on the introduction of new patents by the Indian pharmaceutical companies. *Nerkar and Roberts(2004) and Mueller (2007),* have established that strategic alliances have a positive effect on the launch of patented molecules among pharmaceutical companies. Indian pharmaceutical companies undertaking various activities like manufacturing, R&D, contract manufacturing and distribution and across size of company, have implied impact of strategic alliance with foreign pharmaceutical companies on new patents from Indian pharmaceutical companies.

- *Strategic alliances and launch of generic products abroad*

This research indicates that there is a strong impact of strategic alliances with foreign pharmaceutical companies on the launch of generic products abroad in foreign markets. *Gehl Sampath(2005),* established the contribution of strategic alliances on launch of generic molecules abroad. Companies like Cipla, Ranbaxy, Lupin and Glenmark have made their mark in the international market with high quality generics which were marketed abroad through a number of strategic alliances. Here are a few more alliances in recent times.

- Strides Arcolab Ltd. and GSK to supply of drugs for semi-regulated markets
- Torrent Pharmaceuticals and AstraZeneca Supply of 18 products for various markets
- Strides Arcolab Ltd. and Pfizer to supply of 67 generic drugs to Pfizer with focus on oncology

- *Strategic alliances and launch of generic products in domestic market*

This study indicates that the Indian pharmaceutical companies of varying sizes find that strategic alliances between Indian and foreign pharmaceuticals impact the launch of generic products in the domestic market. However, research indicates that the impact on the launch of

generic products in India is moderately attributed to strategic alliances between Indian and foreign pharmaceutical companies.

- *Strategic alliances and enhanced product portfolio*

This research indicates that Indian pharmaceutical companies across various pharmaceutical activities like manufacturing R&D, contract manufacturing and distribution, feel the impact of strategic alliances with foreign pharmaceutical companies on their portfolios positively.

- *Strategic alliances and access to regulated markets*

Primary research indicates that strategic alliances between Indian and foreign pharmaceutical companies have a positive influence in helping Indian pharmaceutical companies gain access into regulated markets like US and Europe. *Greene (2007) and Gehl Sampath(2005),* have established a strong influence of strategic alliances on access to new markets both regulated and emerging. Osmotica Pharmaceutical Corp. has announced a strategic alliance agreement between Panacea Biotec and Osmotica Kft. for the research, development and commercialization of brand and generic products in the United States and key strategic markets across the globe.

- *Strategic alliances and investment in sales and marketing*

Primary research indicates that strategic alliances between Indian and foreign pharmaceutical companies have a considerable impact in enhancing marketing capability, across all sizes, types and activities of the Indian pharmaceutical company. *Chitoor, Ray and Sarkar (2008)*indicated that alliances enhance investment capabilities among organizations.

Lupin has signed a deal with Eli Lilly for anti-diabetic drugs. Under the deal, Lupin will market and distribute the entire range of Huminsulin brand of Eli Lilly in India and Nepal. Lupin will

deploy 300 sales representatives from its formulations business to promote the product and will also provide education to physicians and patients.

- *Strategic alliances and access to foreign distribution network.*

Primary research indicates that strategic alliances between Indian and foreign pharmaceutical companies have considerably influenced Indian companies, of different sizes, activities and types, to gain access into distribution channels in foreign market. Strategic alliances between Indian and foreign pharmaceutical companies have helped gain access to channels in foreign markets like – Africa, Latin America, Asia Pacific and other regions.

- *Strategic alliances and access to new technology*

Primary research indicates that strategic alliances between Indian and foreign pharmaceutical companies have no impact on the acquisition of new technology by Indian pharmaceutical companies. Alliances that have occurred before 1999, are predominantly driven by manufacturing needs which in turn are technology related. In the current scenario, Indian pharmaceutical companies are not undertaking alliances with foreign pharmaceutical companies with only technology based reasons. Across all the pharmaceutical companies in the study, both with respect to turnover and type of activity undertaken, the companies indicate that there is no great impact of alliances on the technology related aspects.

The recent alliance between DxTech and Piramal indicates just that aspect. The alliance includes a license and development agreement relating to DxTech's proprietary technology to establish a joint venture between the companies for the marketing and sales of the commercial product.

- *Strategic alliances and achieving R&D capability*

Primary research indicates that strategic alliances between Indian and foreign pharmaceutical companies have helped Indian companies achieve R&D capability.Indian pharmaceutical companies are moving from traditional manufacturing related activities towards R&D and

research and strategic alliances are proving to be one of the routes that companies are resorting to.

- Glenmark has entered into an alliance with Forest Laboratories for R&D in Asthma and lung infection areas
- Piramal Resarch is collaborating with Merck for cancer research

In this study across various types of Indian companies the alliances have helped in the development of R&D capability. This is also the case for companies with varying types of activity. Indian companies involved in contract manufacturing and distribution are not really impacted with R&D capability enhancement through alliances. Strong manufacturing based and R&D companies are undertaking alliances which will help them develop their R&D. Most companies who seek out alliances for R&D purposes are in the high turnover category. Literature references that have corroborated this are, *Linton and Corrado(2007), Kiran and Mishra (2009), Bower and Sulej (2007), Gehl Sampath (2005).*

- *Strategic alliances and GMP compliant production capacities*

Primary research indicates that strategic alliances between Indian and foreign pharmaceutical companies have an impact on Indian companies gain GMP compliant capacities. Indian pharmaceutical companies have modern manufacturing facilities which have been used to produce generic drugs through reverse engineering processes. There are more than 175 USFDA and nearly 90 UK-MHRA approved manufacturing facilities in India. Indian pharmaceutical companies have been undertaking exports to both regulated and emerging markets. *Parvatiyar and Gupta(1994) and Gehl Sampath (2005)* have acknowledged the impact of strategic alliances on modern , GMP compliant manufacturing facilities. In this study Indian pharmaceutical companies have confirmed that strategic alliances have helped them develop regulatory compliant facilities in India. This is true for different types of Indian companies, with differing activities and turnover. However companies not involved in production related activities like those involved in R&D , distribution are not really concerned with acquiring regulatory approvals for their facilities.

- *Strategic alliances and access to information*

Primary research indicates that strategic alliances between Indian and foreign pharmaceutical companies have helped Indian companies gain access to information.

One key benefit that alliancing companies enjoy is the access to information. Indian pharmaceutical companies have not been innovators. The technologies and various developments are documented and upgraded in developed nations like Europe and US. When these nations outsource activities to Indian pharmaceutical companies, there is a need for harmonization of processes and protocols between the two entities. This calls for sharing of data and information, upgradation of processes and methodologies which gives way for shared information, beneficial to both the companies. Although there is scope for information sharing, the extent would depend on the kind of enterprise. The information is more relevant in companies undertaking outsourced R&D activities, in comparison to companies involved in distribution activities.

The study indicates high data and information exchange in clinical research, R&D and manufacturing companies. Companies involved in R&D and clinical research have to exchange a lot of information between the alliancing firms. In addition the parent company involved in the alliance would transfer both tacit and practical knowledge to the other company.

- *Strategic alliances and cost optimization*

Primary research indicates that strategic alliances between Indian and foreign pharmaceutical companies have no impact on the cost optimisation in the manufacturing activities of Indian pharmaceutical companies.

Aurobindo Pharma has entered into alliance with Astra Zeneca and Pfizer for the supply of generic drugs for developed and emerging markets. Novartis has entered into an alliances with Torrent Pharmaceuticals for contract manufacturing of formulations. It is a well

known fact that drug manufacture is economical in India in comparison to manufacturing costs in the developed countries. High costs of drugs and the constant pressure to reduce drug costs have encouraged foreign pharmaceutical companies to look out for options to bring down costs. Indian pharmaceutical companies, with reverse engineering and technical knowledge have developed drug manufacturing facilities of international standards.

From Indian company's point of view, there is no impact of the strategic alliance on the optimization of costs. This result is the same across Indian pharmaceutical companies of different type, different activities and different turnover.

- *Strategic alliances and achieving operational synergy*

Primary research indicates that Indian pharmaceutical companies have no implication on operational synergy sue to strategic alliances between Indian and foreign pharmaceutical companies .

Literature indicates that strategic alliance helps in economy of scale due to downsizing and reduction in duplicity of work. Synergy can be achieved by understanding the many processes which are specific to a particular organization and processes which are being duplicated in both the organization. Common inputs, production process and facility, support function and distribution channels are some of the factors that can be common to the alliancing firms. Similarly patented process, customer contacts, sales process , product lines are some of the factors that are specific to a particular organization , which may remain unique. Understanding the duplicating functions and sorting them can help organizations release resources which can be utilized in other areas, thereby enhancing both productivity and profitability.

The study indicates that although there is a considerable scope to achieve operational synergy, Indian pharmaceutical companies do not view achieving operational synergy between the alliancing company as a strong outcome of strategic alliance between Indian and foreign pharmaceutical company. Across all types of Indian pharmaceutical companies and

Indian companies performing different pharmaceutical related activities, operational synergy is not seen as an outcome of strategic alliance.

- *Strategic alliances and quality management*

Primary research indicates that strategic alliances between Indian and foreign pharmaceutical companies have no impact on cost optimisation in their manufacturing activities for Indian companies.

One of the impact that alliances with foreign pharmaceutical have had on Indian pharmaceutical companies is the change in their quality management systems. Complying with GMP and regulatory needs is a compulsory norm for Indian pharmaceutical companies involved in exports to regulated countries. The Central Drugs Standard Control Organization, Ministry of Health and Family Welfare controls information on the regulatory requirement in India. Chaudhuri(2005), mentions that small pharmaceutical companies find it difficult to adhere to GMP standards as the investments for upgrading the production facilities and maintaining them is substantially high. Upto 1970, Schedule M of India's Drug and Cosmetic was in place. In 1991 after TRIPS and GATT, emphasis and awareness for the need of GMP in pharmaceutical manufacturing was highlighted. Small and medium size enterprises are still in the process of adopting GMPs.

Many Indian companies have adopted quality management process as they were involved in exporting the drugs to foreign countries which were following GMP practices.

The study indicates that pharmaceutical companies involved in API and formulations have been benefitted by strategic alliance to gather the technology to upgrade their manufacturing facilities to become quality compliant. However there is no direct correlation between strategic alliances and the enhanced quality procedures of Indian pharmaceutical companies. There are many factors like US FDA regulations, changes in the Schedule M which are more relevant and compelling reasons for companies to upgrade themselves and open up new markets for their products.

- *Strategic alliances and increased market share*

Many pharmaceutical companies have increased their market shares over the years due to enhanced economic activities, which has increased their turnover and in turn increased their market share. Companies actively involved in enhancing their portfolio through strategic alliances have steadily increased their presence in the Indian pharmaceutical market.

- *Strategic alliances and increased overall profitability*

Primary research indicates that strategic alliances between Indian and foreign pharmaceutical companies have helped Indian companies achieve overall profitability.

The profitability of the Indian pharmaceutical company is dependent on the overall turnover of the companies. In the last decade, Indian pharmaceutical companies have increased their profits many folds. This has been achieved by many activities like increased market penetration, enhanced products, diversified activities etc. Many of these activities are direct consequences of strategic alliances with many foreign pharmaceutical companies.

In 2005, Cadila Healthcare earned profits of 192 cr, which grew to 657.5cr in 2012, Lupin grew from 180cr to 804.37cr, DRL increased their profits from 21.1cr to912.4cr , Cipla grew from 445.6 to1123.96 and Sun Pharma from 668 to 1927.98 cr. (*collated from quarterly economic times reports.*

In the study Indian pharmaceutical companies indicate a strong impact on the company's profitability which is attributed to the alliances between foreign pharmaceutical companies. Across all Indian pharmaceutical companies of various types , activities and turnover, the Indian pharmaceutical companies feel a positive relation between strategic alliances and profitability. This is also evident from the fact that the top10 Indian pharmaceutical companies have high turnover and profitability and also have undertaken maximum number of alliances in the last decade.

- *Strategic alliances and brand building*

Primary research indicates that strategic alliances between Indian and foreign pharmaceutical companies have helped Indian companies enhance their brand value.

Brand name and goodwill are two elements that is crucial for a pharmaceutical firm. Many Indian pharmaceutical companies have built strong brands and image for themselves in the international market. Indian companies were well known for their manufacturing capabilities thanks to reverse engineering methods adopted by them. This competency and adherence to Indian regulations built a strong domestic market. International markets required stringent adherence to international regulations and norms. Indian pharmaceutical companies started to concentrate on getting FDA approved manufacturing sites and ventured into international alliances which helped them build credibility and gain recognition.

In the current study, companies with high turnover have indicated that strategic alliances with foreign pharmaceutical companies have helped them establish new brands and generate a brand name, Brands are an advantage for any organization , as they differentiate the organizations. In pharmaceutical industry, since new products are introduced frequently, a brand ensures recall which in turn ensures high revenues. Hence it is the endeavor of every pharmaceutical organization to create brands and ensure a constant stream of revenue for the organization. Cost efficiency, diversified portfolio, economic drivers and domestic presence makes Indian pharmaceutical companies a brand in itself. This is further intensified by the alliances which have helped them become international in their activities and approach.

- *Strategic alliances and acquiring superior managerial skills*

Primary research indicates that strategic alliances between Indian and foreign pharmaceutical companies have helped Indian companies acquire superior managerial skills.

Technical industrial like pharmaceutical is dependent on people and process for its long term success. Gaining knowledge on a specific activity in the pharmaceutical company involves

extensive training and on the job experience. Thus highly trained and qualified employees are an asset to the organization which adds to the competitive advantage quotient of the organization. Although Indian pharmaceutical companies have been recruiting qualified scientists inthe pharmaceutical sector, knowledge on regulations, audits, internationalization, processes are critical to every organization. One of the positive outcomes of strategic alliance between Indian and foreign pharmaceutical companies is the focus on training andhnical competency of the staff. In addition to management of technical aspects, there is critical roles with reference to handling foreign delegation, auditors, inspectors and managing staff performance in a different cultural environment.

The current study indicates that alliances between Indian and foreign pharmaceutical companies have indeed helped the develop management skills among the Indian companies. Across all companies of differing turnover, strategic alliances have influenced the acquisition of superior management skills among the managers which has added to the competitive advantage of the Indian organization.

Strategic alliances between Indian and foreign pharmaceutical companies impact the following aspects of business namely: Product Marketing Technology Manufacturing and Competitive advantage

Strategic alliances between Indian and foreign pharmaceutical companies impact many aspects of the business for Indian pharmaceutical companies. The impact is high in activities relating to new products, marketing and enhanced technology. Moderate impact is seen in case of manufacturing related activities and the aspects relating to competitive advantage of Indian pharmaceutical firms.

6.1.3 Conclusions Relating to Hindrances for Strategic Alliance

The fallout of the alliance between Biocon and Pfizer indicates that it is just not sufficient to look out for alliancing partners and have an alliance. Many things can go wrong in the alliance. The alliance is an expensive process involving time and resource and it is necessary that the objective of the alliance be met. There are many factors which hinder the formation and successful progress of an alliance with a foreign pharmaceutical company. For a successful progress these aspects need to be identified and monitored.

In this study the respondents consider lack of policies, guidelines and governmental support as a key deterrent for the formation of strategic alliances between Indian and foreign pharmaceutical companies.

- *External : Lack of information*

It is not easy to get information of various companies and their work and competencies which will encourage prospective alliance partners to approach each other. This is a real hindrance. Even if the information is known, there is no scope for due diligence from the government or any centralized body which can be a reference. In certain European countries, specific details of the organization, with details of their product lines, pipelines and current areas of work along with the areas where they seek for alliance is maintained and updated. This approach is worth emulating as the background of the companies can also be verified , thus helping build trust and increasing the rates of success for the alliance.

In this study the respondent consider the lack of information as a strong factor which impedes the formation of strategic alliance between Indian and foreign pharmaceutical companies.

- *External : Governmental policies*

Companies indicate that there is no involvement of the government in alliances between Indian and foreign pharmaceutical countries. In case of failure of the alliance, neither of the

companies can fall back to anybody for arbitration. Alliances are built on trust, many a times the trust is breached and the companies will be at loggerheads with reference to shared resources. Since the risks involved are high in alliance with a both Indian and a foreign company, a lack of centralized body which regulates and monitors the alliance is expected. Lack of such a body can prove to be a deterrent for alliance formation.

In this study the respondents consider lack of policies, guidelines and governmental support as a key deterrent for the formation of strategic alliances between Indian and foreign pharmaceutical companies.

- *Internal :Unclear objectives*

Many companies have undertaken alliances riding the "me too" wave, or just to outplay their competition without much thought given to the ultimate objectives and deliverables of a particular partnership. If the objective of alliances is not clear then the alliance cannot be monitored which can lead to misunderstanding and confusion in both the organizations. Alliance agreements are normally written down documents with a specific time frame. For instance:

- Sun Pharma - Merck, for developing, manufacturing and marketing branded generics across emerging markets.
- Cadila Healthcare – Abbott, wherein Cadila will license 24 branded generics to Abbott for 15 emerging markets
- Biocon – Bristol Myers Squibb, for partnership in the research space with focus on discovery and development of NCEs

In the study the respondents indicate that clear objective goes a long way in determining the success of a partnership.

- *Internal :Lack of communication*

Many alliances fallout before their reach their objectives. One of the reason for this is the lack of communication with the parties involved. Alliances involves the coming together of two firms whose background, culture, countries of origin are different. Open communication can help a lot to quell many of the negative aspects as resolution process can be fast and effective.

In the current study, the respondents indicate that lack of communication does cause fractures in the alliance which can ultimately lead to failure to achieve the objectives

- *Internal : Non monitoring of alliances*

Pharmaceutical companies who have successful alliance outcomes have a team of staff who monitor the progress of the alliance. Generally alliances between pharmaceutical companies are a strategic decision, which has clear outcome expectation. Dedicated personnel monitoring the progress of the strategy and its outcomes can provide inputs of the progress of the alliance so that corrective actions can be taken.

In this study the respondents indicate that it is critical to monitor the alliance progress and the success of the alliance is dependent how close the top management is involved in the alliance and its progress.

- *Internal : Lack of trust*

Trust is an important factor which determines the success of an alliance. If the alliancing companies, have clearly stated alliance objectives, then to achieve the objectives both the parties have to trust each other. If there even an inkling of doubt that one firm is misusing the resources of another firm then the alliance will lead to bad vibes which can ultimately result in alliance fallout. The objectives that govern the alliance are more often than not very

sensitive and the proprietary asset of the firm. For instance, marketing a new product or conducting R&D for a NCE are activities which are based on trust factor.

The respondents in the study have indicated strongly that lack of trust is a serious threat to the success of any alliance. Trust can be built by communication, interactions, transparency and clarity on the objectives of both the alliancing companies

6.2 Recommendations for Indian Pharmaceutical Companies Undertaking Strategic Alliances

Based on the study and analyses of strategic alliance between Indian and foreign pharmaceutical companies, the following strategic orientation can be adopted for Indian pharmaceutical companies. The recommendations are categorized into three types: based on turnover, based on activities undertaken by the pharmaceutical companies and based on the types of pharmaceutical companies .

6.2.1 Based on Turnover:

Small pharmaceutical companies

- Concentrate on meeting stringent regulatory norm specified by USFDA, GMP etc. This will help generate new avenue for growth by entering into contract manufacturing for MNCs.
- Develop and upgrade the manufacturing facilities both for capacity enhancement and quality related aspects, this will open up opportunities

Middle tier pharmaceutical companies

- Generic sales particularly to foreign market is a large business segment with scope to grow, Indian pharmaceutical companies should make use of this growth phase. Getting

into alliances with MNCs whose drugs are expected to go off patent, can be an approach. This will help in enhancing the capacity of middle tier companies and help them to reach new market and increase their turnover.

- Concentrate on enhancing their production capacities to be able to take advantage of the growing demand for cheaper drugs. This can be achieved by undertaking collaborations with firms both in India and abroad.
- Gain expertise in regulatory requirement across the world, to develop the necessary competency to cater to all the market across the world. This can be achieved by alliance with a partner with adequate market specific experience and knowledge in regulatory requirement and is in compliance.

Large pharmaceutical companies

- Current Indian skill set is in synthetic chemistry. There is scope for growth in area like new lead molecule new target in new area like medicinal biology and protein chemistry. High level of research and new drug development can be achieved with collaboration with MNC.
- Concentrate effort in BioPharma for both regulated and non regulated markets. Indian pharmaceutical companies can enter into collaboration with BioPharma companies to develop new products. This will take top pharmaceutical companies towards innovation.

6.2.2 Based on Type of Activities Undertaken

Manufacturing :

- Develop international grade of manufacturing facilities which can meet stringent regulatory requirements .
- Undertake alliances with Indian and foreign pharmaceutical firms to utilize the capacity to the fullest and undertake contract manufacturing

R&D:

- Develop strategic alliances with research oriented pharmaceutical companies to access latest advancements in science and technology.
- Provide contract research facilities to other pharmaceutical firms

Contract manufacturing :

- Develop manufacturing capacities to high standards to enable international companies get into alliances
- Focus on meeting stringent regulatory norms both domestic and international
- Enhance production capacities to meet the requirement of the off patent drugs
-

6.2.3 Based on Type of Company :

Active Pharmaceutical Ingredient Manufacturing :

- Develop capabilities to move upwards the value chain towards the manufacturing of formulations and specialty drugs. Can be achieved by alliances and self development .
- Concentrate on alliances with different pharmaceutical companies to supply and develop new API molecules with the growing demand in the market

Formulations :

- Adopt competencies to move towards specialty drugs and R&D . This can be achieved through alliances with suitable partner
- Invest in R&D
- Invest in development of facilities to meet stringent regulations thereby enhancing prospects in domestic and international market

Clinical Research :

- Develop competencies to meet regulatory requirements across the world to enable more scope of clinical research in India .

Strategies for long term success of alliance

- Alliance should be well thought out and directly should be linked to growth objective .
- Alliances should have a clear monitoring at every stage with roles and responsibilities defined
- Communication should be focused on both e internally and with the alliancing partner
- Trust is developed slowly, and can be enhanced with successful alliances for various aspects

Suggestions

- Government needs to initiate a database of each company about the current alliances and the core competency of each company to help prospective alliances select right allaincing partners.

6.3.Future Research Directions

This research work delving on aspects of strategic alliances between Indian and foreign pharmaceutical companies, throws fresh insights into many areas like : reasons for the alliance formation, impact of the strategic alliance and hindrances for alliance success. This is not an exhaustive work, but adds to the already existing literature by reiterating some aspects. However the research has some limitations which can be a future course for in depth research. They are as follows:

- The study has indicated that product related factors of strengthening product portfolio, launching new brands in foreign market and launching new products influence strategic alliance formation. However these are not very strong factors. There may be some specific product related factors which are influential. Future research can throw some more light in this direction.
- The marketing related factors of accessing new global emerging markets and regulated markets and distribution channel abroad may not be the only factors, that encourage alliance formation. There is scope for future research to identify more factors that influence strategic alliances between Indian and foreign pharmaceutical companies.
- Future research can throw light on other technological reasons for strategic alliance. This research study indicates a collaborative R&D to be a significant driver for alliances.
- Although manufacturing related reasons drive strategic alliances between Indian and foreign pharmaceutical companies, the research does not indicate their strong influence. Future research can identify other manufacturing related factors that can influence strategic alliances between Indian and foreign pharmaceutical companies.
- Future research can be directed towards identifying more competitive factors which influence alliance formation between Indian and foreign pharmaceutical companies.
- The current research identifies only 5 areas where the impact of strategic alliances are observed namely :products, marketing, technology, manufacturing and gaining competitive advantage. Strategic alliances has impact on many more aspects of the organization like employees, customers, other alliances etc which are not covered in their research. This can be a future scope of study as this will give the entire picture of the strategic alliance and its impact.
- The factor undertaken in the 5 aspects which are investigated here are not necessarily the only factors that are impacted by strategic alliances. There are other factors which can be influenced by alliances and this is a scope for future research.
- Future research can analyse the other hindrances for the alliance like employee related aspects, training and learning related aspects and market related aspects.

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ANNEXURE 1

QUESTIONNAIRE

1. alliances between Indian and foreign pharmaceutical companies, please rate the factors that have encouraged Indian pharmaceutical companies to form strategic alliances with foreign pharmaceutical companies. *Rate the factors in a scale 1 to 5, with 1 being the least possible Factor and 5 being the most possible Factor that has motivated the alliance .*

1A : Product Related aspects

		1	2	3	4	5
a	Need to strengthen product portfolio					
b	Establish brands and products abroad					
c	Launch new products in domestic and foreign markets					

1B : Marketing Related aspects

		1	2	3	4	5
a	Access to global emerging markets					
b	Access to highly regulated markets					
c	Access to distribution channel in foreign markets					

1C: Technology Related aspects

		1	2	3	4	5
a	Access to new technology					
b	Collaborative R&D					
c	Gain knowhow of USFDA approval processes for production plants					

1D: Manufacturing Related aspects

		1	2	3	4	5
a	Overall cost minimization					

b	Exploit common assets					
c	Access quality management systems					

1E: Gain Competitive Advantage						
		1	**2**	**3**	**4**	**5**
a	Improve market positions					
b	Develop financial strength through high turnover					
c	Build strong company image and goodwill					

2. What has been the impact of strategic alliance between **your** company and a foreign pharmaceutical company. *Please rate the below mentioned aspects on a scale from 1 to 5. With 1 being the area of least impact and 5 being the area of maximum impact.*

2A : Products Related aspects						
		1	2	3	4	5
a	Launched new patented molecules					
b	Launched new generic products in foreign markets					
c	Launched new generic molecules in domestic markets					
d	Gained wider baskets of products in the portfolio					

2B : Marketing Related aspects						
		1	**2**	**3**	**4**	**5**
a	Access to highly regulated market					
b	Gained capability to invest in marketing and sales promotional activity					
c	Access to foreign distribution channels					

2C: Technology Related aspects						
		1	**2**	**3**	**4**	**5**

a	Gained access to new technology					
b	Achieved R&D capability					
c	Gained GMP compliant manufacturing capabilities					
d	Gained access to the latest information on technological and product related upgrades					

2D: Manufacturing Related aspects						
		1	**2**	**3**	**4**	**5**
a	Achieved cost optimization					
b	Able to exploit common assets and achieve operational synergy					
c	Gained knowledge on superior quality management skills and techniques					

2E: Gain Competitive Advantage						
		1	**2**	**3**	**4**	**5**
a	Achieved increased market share					
b	Achieved increased profitability					
c	Established a strong brand name in global market					
d	Gained knowledge on superior managerial skills and techniques					

3. Rate the factors which you think are hindrances in the formation of strategic alliances between Indian and foreign pharmaceutical companies.

		1	**2**	**3**	**4**	**5**
	External					
a	Lack of information and data on organizations interested in alliance					
b	Lack of government policies and guidance					
	Internal					

c	Un clear objectives for alliance formation
d	Lack of communication between alliancing partners
e	Non monitoring of alliance progress
f	Lack of trust among alliancing partners

4. **About the company:**

4A: NAME OF THE COMPANY

4B

Type Of Company	**API (generic)**	**Formulations**	**Clinical Research**	**R&D**

4C

Type Of Activity	**Manufacturing**	**R&D**	**Contract manufacturing**	**Distribution**

4D

Turnover	**<100 Cr**	**100-300Cr**	**300-500 Cr**	**>500Cr**

4E Name of Respondent :

4F . Designation of the respondent

ANNEXURE 2

Collaborations between Indian and foreign pharmaceutical companies (1976-88)

Company	Year	Country	JV	Field of collaboration	Area of collaboration
Sarabhai Chemicals	1976	Indonesia	JV	Antibiotics	Manufacturing
Sarabhai Chemicals	1976	Malaysia	JV	Pharma formulation	Manufacturing
Ranbaxy Laboratories	1977	Nigeria	JV	Drugs & Pharmaceuticals	Manufacturing
Alembic chemicals	1977	UAE		Pharmaceuticals	Manufacturing
Mc Graw Ravindra	1979	Malaysia		IV transfusions solutions	Manufacturing
Chemosyn Pvt ltd	1980	Tanzania		Pharmaceutical formulation	Manufacturing
Dabur Ltd	1981	Nigeria		Pharmaceuticals	Manufacturing
I DPL	1982	Nigeria		Pharmaceuticals	Manufacturing
Unique Pharmaceuticals	1982	Nigeria	JV	Pharmaceuticals	Manufacturing
Ranbaxy laboratories	1983	Malaysia	JV	Pharmaceuticals	Marketing
UnitedChemalode Industries	1984	Nigeria	JV	Pharmaceuticals	Manufacturing
Hoechst India	1985	Nepal	WOS	Pharmaceuticals	Manufacturing
Lupin Laboratories	1987	Thailand	JV	Bulk Drugs	Manufacturing
Ranbaxy laboratories	1987	Thailand	JV	Pharmaceuticals	Manufacturing
Ranbaxy laboratories	1988	Nigeria	JV	Pharmaceuticals	Manufacturing
Pradhan and Alakshendra (2006)					

Collaboration between Indian and foreign Pharmaceutical companies(1993-1999)

List of Collaborations, 1993-1999				
Indian Company	**Year**	**Foreign company**	**Head quarters**	**Description**
Ranbaxy Laboratories	1993	Eli Lilly	USA	Intermediate for Cefaclor
Lupin Laboratories	1993	American Cyanamid	USA	Intermediate for Ethambutol
Shasun Chemicals	1999	Austin Chemical	USA	Joint process development
Source : **Pradhan and Alakshendra (2006)**				

Collaboration between Indian and foreign Pharmaceutical companies(2000-2009)

List of collaborations between Indian Pharmaceutical Companies, 2000- 2009				
Indian Company	**Year**	**Foreign company**	**HQ**	**Description**
Ranbaxy Laboratories	2000	Bayer AG	Germany	Generics
Aurobindo Pharma Ltd	2001	Shanghai Wide Tex Chemical Co ltd	China	60% stake
Ranbaxy Laboratories	2002	Veratide , from Procter & Gamble	Germany	OTC market
Ranbaxy Laboratories	2002	Nihon Pharmaceuticals	Japan	10% equity
Dr Reddy's Laboratories	2002	BMS Laboratories and Meridian Healthcare	UK	Foray into European market
Unichem	2002	Niche Generics	UK	
Ranbaxy Laboratories	2002	Signature Pharmaceuticals	USA	Liquid manufacturing facility

Sun Pharmaceuticals	2002	Caraco Pharmaceutical	USA	Additional stake of 4%
Aurobindo Pharma Ltd	2003	Shanxi Tongling	China	50% stake – JV
Zydus Cadila	2003	Alpharma	France	Formulation business
Ranbaxy Laboratories	2003	RPG (Aventis)	France	
Wockhardt Ltd	2003	CP Pharmaceuticals	UK	
Suven Pharmaceuticals	2003	Synthon	USA	
Jubilant Organosys	2004	Pharmaceutical Services and PSI Supply	Belgium	
Glenmark Pharmaceuticals	2004	Laboratorios Klinger	Brazil	
Wockhardt Ltd	2004	Esparma Gmbh	Germany	
Glenmark Pharmaceuticals	2004	Clonmel Healthcare	Ireland	Two FDA approved products
Nicholas Piramal India	2004	Rhodia OrganiqueFine Ltd	UK	Inhalation Anesthetics
Dr Reddy's Laboratories	2004	Trigenesis Therapeutics	USA	
Sun Pharmaceuticals	2004	Women's First Healthcare	US	Acquired 3 brands
Glenmark Pharmaceuticals	2005	Servycal SA	Argentina	
Matrix Laboratories	2005	Docpharma NV	Belgium	
Strides Arcolab	2005	Strides Latina	Brazil	12.5% stake
Glenmark Pharmaceuticals	2005	Instituto biochimico Industria Farmaceutica Ltda	Brazil	Hormonal brand, Uno – Ciclo
Nicholas Piramal India	2005	Biosyntech	Canada	17percent stake
Matrix Labortaories Ltd	2005	Mchem group	China	60 percent stake
Torrent Pharmaceuticals	2005	Heumann Pharma Gmbh & Co Generica KG	Germany	
Sun Pharmaceuticals	2005	Valeant Pharma	Sun	Manufacturing
Strides Arcolab	2005	Beltapharm	Italy	70% stake
Dr Reddy's Laboratories Ltd	2005	Roche's API unit	Mexico	
Strides Arcolab	2005	Sterile Manufacturing facility	Poland	
Glenmark Pharmaceuticals	2005	BouwerBarlett	South Africa	
Ranbaxy Laboratories	2005	Efarmes Sa	Spain	
Dishman Pharma	2005	Synprotec Ltd	UK	
Nicholas Piramal	2005	Avecia Pharmaceuticals	UK	
Jubilant Organosys	2005	Trinity Labs	USA	
Sun Pharmaceutical	2005	Able Labs	USA	
Malladi Drugs	2005	Novus Fine chemicals	USA	
Jubilant Organosys	2005	Trinity Laboratories	USA	64 percent equity

Jubilant Organosys	2005	Target Research Associates	USA	
Strides Arcolab	2005	Biopharma	Venezuela	
Marksans Pharma	2006	Nova Pharmaceuticals	Australia	
Dr Reddy's Laboratories	2006	Betapharm Arzneimittel	Germany	
Kemwell Pvt	2006	Pfizer's manufacturing plant	Sweden	
Dishman Pharmceuticals	2006	IO3SLtd	Switzerland	51 percent equity
Aurobindo Pharma	2006	Milpharm	UK	
Natco Pharma	2006	NICK's Drug store	USA	
Ranbaxy Laboratories	2006	Seneteck's Autoinjector business	USA	Patents , trademarks
Ranbaxy Laboratories	2006	Allen SpA- division of GSK	Italy	Unbranded Generics
Matrix	2006	Mylan	USA	

Source : Compiled from Pradhan and Alakshendra (2006), krc-pharma -2009, India pharma2015, KPMG- Indian pharma outlook

Nicholas Piramal – Alliances

Company	Country/ year	Objective
Outward		
Nicholas Labs	1988	Generics
Roche Products Lt d	1993	Diagnostics
Boehringer Mannheim	1996	Diagnostics
Hoechst Research centre	1998	Generics
Rhone Poulence India Ltd	2000	Products
ICI Pharma	2002	Generics
Global Bulk Drugs	2003	Generics
Sarabhai Piramal	2003	Manufacturing
Rhodia UK	2005	Manufacturing
Avecia Pharmaceuticals	2005	Generics
Pfizer Morepeth Site	2006	Generics
Khandelwal Laboratories	2008	Manufacturing
HLPL Bangalore	2008	Manufacturing
Minrad International Inc	2009	Generics
RxElite Inc	2009	
Alliances and Joint venture		
Biogen		Generics
Chiesi	Italy	Generics
PFDC		Generics
Gilead Sciences	USA	Manufacturing
Genzyme C		Manufacturing
Allergan	USA	Manufacturing

IVAX corp	UK

Glaxo Smithkline – Alliances

Glaxo Smithkline – Alliances		
Company	**Reason**	**Portfolio**
Dr Reddys (2009)	Market selected products	emerging markets excluding India
Ranbaxy	R& D	NCE and co-commercialization

Zydus – Alliances

Zydus – Alliances		
Outward		
Company	**Country**	**Products**
Bayer Schering Pharma	Germany (2010)	Manufacturing
Mallinckrodt	USA(2005)	Generic manufacturing
Abbott	USA(2010)	Market ZC products in emerging markets
Inward		
Eli Lilly	USA(2009)	Research in CV drug development
Zambon Group	Italy (2005)	formulation, development and marketing of API
Domestic		
Kopran	Marketing and manufacturing	formulation brands (2001)
Bharath serums and vaccines	Manufacture NDDS(2005)	anticancer for global market

Alembic – Alliances

Alembic – Alliances		
Inward		
Company	**Country**	**Products**
Chiron Corporation (2003)	USA	Contract research- cancer and vaccines
Domestic		
Dabur Pharma (2007)		CVS, Diabetic and GI - lifestyle segment

Recent Alkem – Alliances

Alkem – Alliances		
Inward		
Company	**Country**	**Products**
Oculus Innovative Sciences	California (USA)- 2006	super oxidized solution with Microcyn technology, for wound and abrasions

Annexure 3

LIST OF PUBLICATIONS

Publications

- Branding in Pharmaceutical industry: Integration of condition and product branding for effective DTC (Direct - to- consumer) marketing, Anvesha, Vol. 3 No. 2 , July- Dec 2010, ISSN:0974-5467

- Retailing in generic pharmaceutical products in India: A study of B2B customer perceptions on opportunities, challenges and strategies for sustainable growth, Epoch Strategies for Marketing, Family business and Entrepreneurship, Nirma University Ahmedabad , ISBN: 978-93-81361-68-9

- 'Strategic Alliances in Indian Pharmaceutical Industry: A Competitive Collaborative Advantage' in 'Collaborative Competition & Other Readings' published by DMIMS, Nagpur, 2010. ISBN: 978-81-8488-690-0

Conferences- Paper Presentation

- IMRA international conference on "Emerging Markets and New Dynamics of Management" London, UK. Poster presentation on "strategic alliances between Indian and foreign pharmaceutical companies"
- International conference – Nirma Institute of Management. Presented paper on "Retailing in Generic Pharmaceutical Products in India: A study of B2B Customer Perceptions on Opportunities, Challenges and Strategies for Sustainable Growth"
- National conference – MS Ramiah Institute of Management. Presented paper on "Branding in pharmaceutical industry: Integration of condition and product branding for effective DTC (Direct - to - Consumer) marketing.

Annexure 4

GLOSSARY

Foreign Pharmaceutical company : Pharmaceutical companies based in a foreign country

Indian pharmaceutical companies : Pharmaceutical companies started and based in India

New patented molecules: Pharmaceutical molecule developed and patented for the first time

Generic Pharmaceutical products Pharmaceutical molecule which has gone off patent

Product portfolio for a pharmaceutical company: Refers to the product basket under various therapeutic segments.

R&D Capability: Ability to undertake research independently to produce new therapeutic molecules

GMP compliant manufacturing sites :Manufacturing facility which complies with GMP – Good Manufacturing Facility Practices

Global Markets : Refers to international markets

Regulated Market : Pharmaceutical market in US, Canada, UK , European Union , Australia

Profitability : Overall profits including sales turnover

Managerial knowhow: Managerial skills